Community News

www.scg.ch

www.chemanager-online.com

SCS Swiss Chemical Society

SWISS CHEMICAL SOCIETY NEWS

Women in science

The new edition of the 'She Figures report' prepared by the European Commission puts into focus a clear message: women continue to be under-represented in science, technology, engineering and mathematics (STEM). The gender gap has over the past years not changed much. Figures show that the proportion of women researchers in the EU was of 33,4% in 2015, compared to 33% in 2012.

Lutgarde Buydens, Rector at Radboud University in the Netherlands, and one of the speakers at our EuChemS workshop on 7 March focused on the gender gap and the 'leaky pipe' – the situation whereby the number of women drops the higher up we climb the academic ladder. Whereas the proportion of women graduate students reaches 50%, this drops to 40% in PhD candidates, dropping down to 35% for associate professors, and 20% for full professors. Professor Buydens moreover emphasised the continued and often unrecognised bias (and implicit bias) expressed in our everyday actions and practices, with direct repercussions in how women are hired, promoted, perceived.

Some ways to counter this bias is to raise awareness of it, install gender and diversity committees in universities and research centres, introduce awareness training sessions for those who hire and select candidates, amongst a range of other issues.

Awareness of the gender gap is most likely at an all-time high, yet the slowness of change is testament to a deeply rooted issue that won't be solved on its own. Direct and concrete steps are needed to ensure equal opportunities for all. Indeed, the Royal Society of Chemistry's Breaking the Barriers report starkly states: "continuing at the current rate of change, we will never reach gender parity".

And on a side note, a separate study by the European Commission has also shown that increasing women's participation in politics has clear positive impacts on the quality of governance, transparency and accountability!

Source: *www.euchems.eu/newsletters/women-in-science/*

SCS implements a Women in Chemistry Network

The Swiss Chemical Society likes to actively push the efforts to gender equality in natural sciences and started a new initiative. The task group led by Maud Reiter, Firmenich, Rachel Hevey, University of Basel and Rebecca Buller, ZHAW Wädenswil, will implement offers to strengthen the interaction between women in chemical and pharmaceutical sciences from academia and industry and to increase the visibility of female researchers. More about the ‚Women in Chemistry Network' will be communicated on our website and the coming CHIMIA issues.

Transformative Chemistry for a Sustainable Energy Future

Climate change makes it imperative that we discover ways of producing energy and chemicals sustainably and replacing the fossil fuels that form the basis for our energy and chemical industry. ENERGY-X will develop the science and the technology needed to enable economically sound production of carbon-neutral fuels, chemicals, and materials.

The ENERGY-X CSA (Coordination & Support Action), funded by the EU's Horizon 2020 programme, kicked-off on March 4th, 2019, in Prague. It will mobilise European researchers and industry over the next twelve months, in order to build a strategic roadmap towards a large-scale research initiative addressing the efficient conversion of solar and wind energy into chemical form. The ENERGY-X CSA includes 13 partners across Europe (Technical University of Denmark, Max Planck Society, Ghent University, Jerzy Haber Institute of Catalysis and Surface Chemistry Polish Academy of Sciences, CEA, Czech Academy of Sciences, Utrecht University, ERIC aisbl, ETH Zürich, RWI, Technical University of Valencia, DECHEMA, and EERA aisbl), and is supported by a large group of industrial companies.

ENERGY-X will contribute to new science and disruptive technology in the field of molecular and interfacial catalysis, and will combine this ambition with scale-up to industrially relevant conditions by integrating with European industry. Three central chemical processes for converting water, CO_2, and N_2 to fuels and base chemicals are the scientific targets.

Project coordinator Jens K. Nørskov, Villum Kann Rasmussen Professor at the Technical University of Denmark, said, "The approach is to aggregate fragmented knowledge and excellence throughout Europe by building on the existing critical mass and developing an ecosystem to overcome the unresolved barriers to these chemical conversion technologies. ENERGY-X will not only create scalable scientific solutions but also transfer this knowledge into two demonstration projects, namely the manufacturing of carbon-neutral aviation fuels and the decentralised production of fertilisers with zero CO_2 footprint."
Website: *energy-x.eu*

EPFL strengthens its brand identity for its 50th anniversary

EPFL's new brand identity is centered on its acronym. The logo, composed of the School's four letters, is simple yet sophisticated, and it proudly bears Switzerland's hallmark red color. "We wanted a logo that reflects our school's energy, pioneering spirit, technological leadership and international reach. In other words, our identity as a startup that has grown rapidly and is now an adult," says EPFL President Martin Vetterli.

The School worked with Lausanne-based branding agency Moser Design to develop its new brand identity. Two online surveys were carried out to evaluate how EPFL is perceived both within its community and by the general public. Some 20,000 people participated in the survey, pointing to brand attributes such as excellence, international reputation, engineering, innovation, research and Swiss-based.

The font selected for the new logo, Helvetica Neue, was created in Switzerland and is well-known around the world. It was born in the 1960s, like EPFL, and it symbolizes Switzerland's place at the forefront of technology at the time. The agency reworked the original font slightly to make it more contemporary, easier to read and unique, and to better reflect where EPFL is today. "Developing a new brand identity for an institution like EPFL was an exciting challenge. The School profoundly affects the lives of those who study or teach there. As a hub of research and knowledge, EPFL is a source of personal and professional fulfillment. We wanted to reflect all of that in the new design," says Caroline Moser, CEO of Moser Design.

The new visual identity consists of more than just the logo, as it covers the full range of graphic elements that convey the School's brand. The logo itself figures prominently on campus, in the form of a 2.6-meter-high metal sculpture next to the Rolex Learning Center.

Source: Mediacom / *news.epfl.ch*

A Warm Welcome to Our New Members!

Period: 26.02.–14.03.2019

Juliusz Adamski, Baden – David Benzies, Nottingham (GB) – Michèle Clerc, Wollerau – Mohab EL Hawary, Crissier – Patrick Finkelstein, Zurich – Marianne Fleuti, Prague (CZ) – Nicole Hauser, Zizers – Chieh-Szu Huang, St. Gallen – Fuze Jiang, Zurich – Joseph J. Laux, Ermatingen – Christine Merkert, Steiwenden (DE) – Nicole Meyer, Aarau – Sonja Osbilds, Zurich – Dalila Rocco, Basel – Leos Valenta, Zurich – Seraphine Zhang, Zurich.

JOURNAL NEWS

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A Visible-Light-Driven Molecular Motor Based on Pyrene
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Full Papers

Synthesis of Ferrocene Derivatives Allowing Linear Free Energy Studies of Redox Potentials
Byung Joon Lim, Inhong Hwang, Andrew D. Ellington, Jonathan L. Sessler

Nucleation and Crystal Formation in Lithium Disilicate-Apatite Glass-Ceramic from a Combined Use of X-Ray Diffraction, Solid-State NMR, and Microscopy
Wei-Chih Liao, Markus Rampf, Marc Dittmer, Christophe Copéret, Wolfram Höland

Chemoselective Derivatization of Folded Synthetic Insulin Variants with Potassium Acyltrifluoroborates (KATs)
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Thioether-Functionalized Quinone-Based Resorcin[4]arene Cavitands: Electroswitchable Molecular Actuators
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Louis Pasteur, Chemist: An Account of His Studies of Cinchona Alkaloids
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Synthesis and Reactivity of 5-Bromopenta-2,4-diynenitrile (BrC5N): an Access to π-Conjugated Scaffolds
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Formal [4+1] Cycloaddition of o-Aminobenzyl Chlorides with Isocyanides: Synthesis of 2-Amino-3-Substituted Indoles
Jacobus A. W. Jong, Xu Bao, Qian Wang, Jieping Zhu

Configurational Lability of Imino-Substituted Ethano Tröger Bases. Insight on the Racemization Mechanism
Alessandro Bosmani, Alejandro Guarnieri-Ibáñez, Jérôme Lacour

Full Papers

Inhibitors of the Bifunctional 2-C-Methyl-d-erythritol 4-Phosphate Cytidylyl Transferase/2-C-Methyl-d-erythritol-2,4-cyclopyrophosphate Synthase (IspDF) of Helicobacter pylori
Annika Honold, Clara Lettl, Franziska Schindele, Boris Illarionov, Rainer Haas, Matthias Witschel, Adelbert Bacher, Markus Fischer

Label-Free Quantification of 5-Azacytidines Directly in the Genome
Sarah Schiffers, Thomas M. Wildenhof, Katharina Iwan, Michael Stadlmeier, Markus Müller, Thomas Carell

[2.2.2.2](2,7)-1-Bromonaphthalenophane from a Desymmetrized Building Block Bearing Electrophilic and Masked Nucleophilic Functionalities
Guangke Cai, Shreyam Chatterjee, Ichiro Hisaki, Yoshito Tobe

Leveraging Fluorescent Emission to Unitary Yield: Dimerization of Polycyclic Aromatic Hydrocarbons
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Tetravalent Pseudomonas aeruginosa Adhesion Lectin LecA Inhibitor for Enhanced Biofilm Inhibition
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Enantioselective Total Synthesis of (–)-Doliculide Using Catalytic Asymmetric Hydrogenations
Wen Che, Danyang C. Wen, Shou-Fei Zhu, Qi-Lin Zhou

https://onlinelibrary.wiley.com/journal/15222675/

INDUSTRIAL NEWS

Source: *www.chemanager-online.com*

Chemspec Europe 2019 – Europe's most Renowned Industry Hotspot for the Fine and Speciality Chemicals Industry

February 25, 2019: Chemspec Europe is Europe's premier marketplace for the fine and speciality chemicals industry. The exhibition offers manufacturers, suppliers and distributors of fine and speciality chemicals a dedicated marketplace to meet with purchasers and agents looking for specific products or bespoke solutions. Chemspec Europe is renowned for its specialised profile, providing a platform to market your products and solutions exclusively to the fine and speciality chemicals community. To round-off the exhibition experience, top-class conferences presenting the latest findings from ongoing R&D projects offer numerous networking opportunities. The 34th edition of this highly successful industry event will take place from 26–27 June, 2019 at Messe Basel, Switzerland. The Basel region is one of Europe's major hubs for the fine and speciality chemicals industry and borders three of Europe's strongest countries in this sector – Germany, France and Switzerland. Chemspec Europe 2019 in Basel will provide companies with the ideal platform to actively promote their specialised products and bespoke solutions to key decision makers from all over the world. Exhibiting companies at Chemspec Europe 2018 included: Albemarle • AlzChem • BASF • CABB • Chemical Industries Association • Dottikon Exclusive Synthesis AG • ESIM Chemicals • IVICT Europe / Mitsubishi Corporation • Johnson Matthey • Lonza • Robinson Brothers • Saltigo • Siegfried • SOCMA • SOLVAY • Sumitomo Chemical Europe • Vertellus • WeylChem. Chemspec Europe exhibitors are manufacturers, distributors, regulators, equipment suppliers, raw materials suppliers, traders, agents and consultants offering various products, services and equipment.

Roche Pays $4.3 Billion for Spark Therapeutics

February 28, 2019: Swiss drugs giant Roche has agreed to pay $4.3 billion for Spark Therapeutics, marking the latest purchase of a biotech company by big pharma. The deal gives Roche the first US-approved gene therapy Luxturna and some hemophilia candidates, among others. Spark's blindness treatment Luxturna also gained EU marketing approval last year. "As the only biotechnology company that has successfully commercialized a gene therapy for a genetic disease in the US, we have built unmatched competencies in the discovery, development and delivery of genetic medicines," said Jeffrey Marrazzo, Spark's CEO. "With its worldwide reach and extensive resources, Roche will help us accelerate the development of more gene therapies for more patients for more diseases and further expedite our vision of a world where no life is limited by genetic disease," he said. Spark Therapeutics was founded in March 2013 out of the Children's Hospital of Philadelphia in Pennsylvania, USA. Its lead clinical asset is SPK-8011, a novel gene therapy for hemophilia A, which is expected to start Phase 3 trials this year. The company also has SPK-8016 in a Phase 1/2 trial, aimed at addressing the hemophilia A inhibitor population. Spark is also developing therapies for Pompe disease, CLN2 disease, Huntington's disease and Stargardt disease. Both companies' boards have approved the merger, which is expected to close in the second quarter of 2019. Under the terms of the agreement, Roche will promptly commence a tender offer to acquire all outstanding shares of Spark common stock, and Spark will file a statement recommending that its shareholders tender their shares to the Swiss pharma. After closing, Spark will continue to operate in Philadelphia as an independent company within the Roche Group. Raju Prasad, an analyst with US financial services company William Blair, said the deal is a "sound strategic fit" for Spark. Analysts at Jefferies added that the acquisition offers a "compelling strategic rationale" for Roche and hands the drugmaker a "validated gene therapy platform and manufacturing capability". Recent pharma-biotech deals include Bristol-Myers Squibb's proposed takeover of Celgene for $74 billion in January, which was swiftly followed by Eli Lilly's plans to buy Loxo Oncology for $8 billion.

Messer and CVC Close Linde/Praxair US Assets Buy

March 4, 2019: At the beginning of March, Messer Industries, new joint venture of Germany-based industrial gases producer Messer and private equity group CVC Capital Partners, completed the acquisition of the majority of Linde's gases business in North America, along with certain Linde and Praxair business activities in South America. The largest German player and the largest US gases market player are in the process of merging to become the world's largest industrial gases producer, passing France's Air Liquide. Messer said it plans to invest about $3.6 billion (€3.2 billion) in the joint venture, to which it will contribute the majority of its West European subsidiaries. These include businesses in Benelux, Denmark, Germany, France, Spain, Switzerland and Portugal as well as Algeria. The companies with some 830 employees had sales of €339 million and EBITDA of €54 million in 2018. Being able to acquire the assets Linde was forced to divest in exchange for regulatory approval of the merger with its US rival is a "once-in-a-lifetime opportunity" for his company, said CEO and owner Stefan Messer. The deal included 45 air separation plants, 18 carbon dioxide plants, 12 helium filling stations, a hydrogen liquefaction unit and 12 filling and distribution facilities for industrial and specialty gases The new partnership with CVC will allow the German gases producer to return to the North and South American markets and again become a global player while at the same time consolidating its position as the largest family-run industrial gases specialist worldwide, Messer said. With some 5400 employees, the Linde activities Messer is acquiring in the US, Canada, Brazil and Colombia, along with Praxair's Chilean operation, generated sales of $1.8 billion (€1.6 billion) and EBITDA of around $408 (€359 million) in 2018.

Novartis Back in the Spotlight at Cohen Hearing

March 5, 2019: Novartis' ill-advised attempt two years ago to get an inside look at drugs pricing policies of newly elected US president Donald Trump came back to haunt it last week during the hearing of former presidential lawyer Michael Cohen in the House of Representatives. Cohen will soon begin serving a prison sentence for multiple offenses stemming from his time as Trump's personal lawyer – including campaign finance violations, tax evasion, making false statements to a bank and lying to Congress – but not directly related to his interaction with the

drugmaker. The story Cohen told the House committee hearing reportedly contradicted the Swiss company's original version of its actions in several ways, including how often it interacted with him and what it hoped to gain from a consulting agreement. Novartis last year acknowledged hiring Cohen-led Essential Consultants for what it thought would be advice on "health care policy matters" involving the US pharmaceutical market. Altogether, the payments totaled $1.2 million. News agency Reuters said Cohen told the committee the drugmaker initially wanted influence with the president more than insight: Novartis "sent me their contract, which stated specifically that they wanted me to lobby. They wanted me to provide access to government, including the president." The former Trump attorney and confidante told the hearing he had informed Novartis he "would not lobby or do government relations work." In a 22-page report last summer, Democratic senators said Novartis' ex-CEO Joe Jimenez had worked directly with Cohen several times and exchanged multiple emails and phone calls with him on several subjects, including drugs pricing and opioid lawsuits. The connection between the drugmaker and the Trump lawyer was revealed in May 2018 by an attorney representing an adult film actress who claimed an alleged sexual encounter with the president. In the aftermath, Novartis CEO Vas Narasimhan, who took over the position from Jimenez, pledged to improve the company's ethical standards. In regard to statements made at the hearing last week, the company said it had "previously addressed all questions regarding our relationship with Essential Consultants, and we consider this matter closed."

Biogen Takes Nightstar Therapeutics for $877 Million

March 8, 2019: Biogen has agreed to acquire Nightstar Therapeutics, a clinical-stage gene therapy company based in London, UK. The US drug firm will pay Nightstar shareholders $25.50 for each share they hold, valuing the company at about $877 million. Nightstar's entire share capital (both issued and to be issued) will be acquired by Tungsten Bidco, a newly incorporated company and wholly-owned subsidiary of Biogen Switzerland Holdings. The acquisition will be implemented by way of a UK court-sanctioned scheme of arrangement as defined by the UK Companies Act. Nightstar is focused on developing and commercializing adeno-associated virus (AAV) therapies for inherited eye diseases that would otherwise progress to blindness and for which there are currently no approved treatments. "With this proposed acquisition, we are continuing to bolster our pipeline and further execute our strategy to develop and expand a multi-franchise neuroscience pipeline across complementary modalities," commented Biogen CEO Michel Vounatsos. "Nightstar would accelerate our entry into ophthalmology by contributing two mid- to late-stage gene therapy assets, with the potential to create long-term shareholder value," he said. Nightstar's lead candidate NSR-REP1 is currently in Phase 3 trials for treating patients with choroideremia, a rare degenerative, genetic retinal disorder that mostly affects males. Data from Phase 3 is expected to be available in the second half of 2020. A second candidate, NSR-RPGR, is being evaluated in the Xirius clinical trial for treating patients with X-linked retinitis pigmentosa, an inherited X-linked retinal disease that also primarily affects males. The abnormality results in retinal dysfunction by adolescence and early adulthood, progressing to blindness by the time patients are in their 40s. Last September, Nightstar announced positive Phase 1/2 data from the dose escalation part of the Xirius trial; the Phase 2/3 dose expansion portion of that trial is ongoing. Commenting on the acquisition, Nightstar CEO David Fellows said: "Our agreement with Biogen will give us the platform and resources to expand our mission to maintain and restore sight in patients with inherited retinal diseases. Together, with Biogen's expertise in rare diseases, worldwide reach and extensive resources, we will dramatically improve the lives of patients around the world who currently have no treatment options." Biogen, which is funding the purchase through available cash, expects to close the transaction by mid-2019. Completion remains subject to the usual closing conditions, approvals from both Nightstar shareholders and regulators, as well as the issuing of a UK court order.

Digitization in All Business Areas

March 13, 2019: Reorientation and tradition, transformation and experience, concentration and competence: How does a company manage change in times of digital transformation? M+W, a German engineering company founded in 1912, was renamed in 2018 into the Exyte Group. The company designs, develops and builds high-tech factories and equipment with special expertise in controlled and regulated manufacturing environments. Volker Oestreich spoke with François Abiven, CEO of the Life Sciences & Chemicals Global Business Unit at Exyte. CHEManager: Mr. Abiven, the history of Exyte is long and quite eventful. How did it come about that your company has now repositioned itself with a new name? Francois Abiven: You are right, Exyte's (former M+W) track record goes back over 100 years and the company is now a global leader in the design, engineering and construction of controlled and regulated high-tech facilities. Last year, Exyte has refocused its business, focusing on three strategic business segments – semiconductor, life sciences & chemicals and data center – in order to continue to profit from the vast growth potential in its target markets. A new brand name was therefore the logical next step in our strategic development. With "Exyte" we have chosen a name that reflects both, our strategy and our growth ambitions as well as our unparalleled experience and engineering excellence as cleanroom technology pioneers. How do your customers benefit from the reorganization? F. Abiven: While our heritage remains an important part of our identity, we must always be looking ahead. For us, Life Sciences & Chemicals is a strategic business segment where we focus on Pharmaceuticals & Biotechnology and Food & Nutrition. Our customers enjoy working with us, because we deliver high-quality turnkey solutions for their most important investments on

time and on budget all over the world. In the framework of our reorganization, we have established a matrix management structure focused on three strategic business segments and three core regions: Life Science & Chemicals, Advanced Technology Facilities and Data Center in the European, American and Asian markets. This structure allows us to better transfer our knowledge about the needs of our existing customers and suppliers. It also makes us more agile and allows us to enter and lead the way in new business areas, such as personalized medicine. The experience and customer relations of long-standing employees are of great importance for a technology company like Exyte. How do you assess the recent personnel upheavals in your company from this point of view? F. Abiven: Since 2017, Exyte has undertaken several steps to reorganize and refocus its strategy to fast growing markets. The realignment had an impact on our internal structure, but it also offered the opportunity to bring new talents and experienced managers and employees into our company and to tackle the future under the new focus with them. In order to drive our growth successfully and retain our market leading position, we constantly look out for talent in all the regions we operate in – particularly in the countries Germany, Austria, Switzerland, in the USA as well as in China and Singapore. In addition, it is our aim to retain experienced and qualified managers and employees for the long term. Equipment productivity, product quality and short time-to-market are important competitive factors in the process industry. What role do plant management and a seamless flow of information play in the context of digitization and IIoT? F. Abiven: Both, plant management and a seamless flow of information are extremely important criteria for success. While automation in mass production is well advanced, it is now important to network the processes and improve efficiency in production through analysis and the smart use of data. The industry must use more and more cyber-physical production processes. Networking and machine learning are the prerequisites for the autonomous control of more and more areas of production in the future. Digitization in all business areas from administration to the steering and executing of projects is one of the key elements of our strategic program. Its main objective is to optimize project delivery and to ensure a future-proven design and engineering process. Our key focus in this field lies on automation, collaboration and cybersecurity with regard to existing industry standards. Acting according to the highest standards in these fields will allow us to meet the needs of our customers in the long term. Global macro trends, such as the Internet of Things, Artificial Intelligence and Industry 4.0, particularly with respect to the semiconductor, food & nutrition and consumer care markets, are significant drivers of our growth. Modular plant concepts will play an important role in the future, especially in life sciences and chemicals. How does Exyte support these approaches so that, in addition to the technical process interconnection, an efficient and manufacturer-independent coupling of the automation can also be realized? F. Abiven: Modular plant concepts in Pharma have been around since about 30 years, but have remained in a niche due to some significant shortcomings. Our offering will be smoothly adaptable to the different needs, applications and local regulations. With this advanced approach, we expect to shorten the time-to-market by 50%. Our vision goes further: We plan to offer transportable boxes, i.e. product and service from a single source, and our engineers are already working on design concepts of the next decade that provide seamless Plug & Play automation, continuous manufacturing and other advanced technologies. Especially in the regulated industries, GMP requirements and specifications from authorities such as the FDA require a great deal of effort and expertise. How can you support your customers in these areas? F. Abiven: We combine expertise and experience in plant engineering and process engineering with GMP-compliant automation and an IT environment that ensures data integrity within the plant and throughout the entire value chain. Based on our long-standing history in cleanroom technology and our excellence in cleanroom engineering, we profit from an in-depth understanding of the regulatory frameworks in all relevant regions and industries and can support our clients with subject-matter experts in all industry-relevant topics. We are the one and only general contractor with an integrated delivering model. This gives us the unique position to serve our clients from a regulatory point of view by leveraging our regional centers of expertise, manufacturing capabilities, self-performing units and our global network of highly experienced experts. Digitization, Big Data and the IIoT promise more flexibility and efficiency – but only if you use the collected data sensibly and are resistant to cyber threats. Does that spoil the fun on the road to industry 4.0? F. Abiven: Security of data is a key challenge of our time and certainly a matter of preparation. Based on our long-term experience we are much engaged in the cyber security of complex assets and networked systems that have to meet the specific needs of different and regulated industries. The spectrum of cyber security solutions we offer covers the entire life cycle of a factory or plant, their automation and production data systems. Our services include IT security consulting for operator requirements and the implementation of information security management systems for IT and production. As far as it regards cyber, we must engage with technology to continue to refine practical cyber security policies and processes.

Fujifilm Boosts Healthcare with Biogen Plant

March 13, 2019: Japan's Fujifilm is boosting its healthcare business with the proposed acquisition of Biogen (Denmark) Manufacturing for around $890 million in cash. The deal gives Fujifilm a large-scale biologics manufacturing complex in Hillerød, near Copenhagen in Demark, which will become the Tokyo-headquartered group's fourth biopharmaceutical contract development and manufacturing site. Biogen is opening new biologics facilities in Switzerland and no longer needs the Danish plant. Biogen Hillerød has six 15,000-liter bioreactors for

manufacturing cell-culture derived biologics. Fujifilm said the facility will significantly expand its capacity and capabilities to support projects from the pre-clinical phase through to commercialization, and from small to very large-scale volumes. "This significant investment demonstrates our continued commitment to grow the Bio CDMO business and become an industry leader by combining resources of Biogen Hillerød and Fujifilm," said Shigetaka Komori, Fujifilm's chairman and CEO. The transaction is expected to complete around August 2019, subject to the usual closing conditions and regulatory approvals. Fujifilm has made several acquisitions in recent years to expand and diversify its healthcare portfolio. On Jun 1 last year, the company completed its purchase of Irvine Scientific and IS Japan for around $800 million. In addition, the Japanese firm, best known for its photographic and imaging equipment, has been "aggressively" investing to expand capacities and process development capabilities at the sites of its Fujifilm Diosynth Biotechnologies (FDB) subsidiary in the UK and USA. In January this year, FDB announced it would extend its services to include aseptic filling of recombinant proteins during the fiscal year ending March 2021. At the same time, the company introduced Apollo X, its next-generation mammalian expression system that it said could deliver industry leading titres in excess of 10 gram/liter. Fujifilm established its bio CDMO business in March 2017 with the aim of achieving 100 billion yen in sales by fiscal year ending March 2024 through aggressive capital investment and the development of highly efficient and highly productive technologies. The company develops and manufactures a variety of biologics including recombinant proteins, monoclonal antibodies, viral vaccines and gene therapies.