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SWISS CHEMICAL SOCIETY NEWS

Minutes of the 32nd General Assembly of the Swiss Chemical Society 2022



April 22, 2022, 13.30–14.00
University of Geneva

1. Welcome; Approval of the Agenda

During the lunch break of the SCS Spring Meeting, Christian Bochet, President, and David Spichiger, Executive Director, opened the assembly and welcomed all members/attendees. The

agenda was approved.

2. Election of the vote counters

At the beginning 41 SCS members were present and until the end of the assembly about 120 participants joined the assembly. The president proposed Richard Smith as vote counter and the assembly approved the proposal unanimously.

3. Minutes of the 31st GA from April 15, 2021, online

The minutes were published in CHIMIA (2021, 75, No. 5, A459f). The minutes are approved unanimously and without abstention.

4. Annual Report 2021

The annual report was published in CHIMIA (2022, 76, No. 1–2, A176ff). It was approved unanimously.

5. Financial report 2021 and audit report

David Spichiger presented the financial statement. Incomes of CHF 1'382'945 and expenses of CHF –1'719'095 result in an operating loss before taxes of CHF –336'150. The portfolio at Bank von Graffenried performed well and resulted in a value increase of CHF 407'635. Considering taxes and non-periodic income and expenses of –11'895, an overall surplus of CHF +59'590 resulted. The SCS funds profited from the positive development at the stock markets as well and an overall surplus of CHF + 384'2182 resulted.

As of 31.12.2021 the assets summed up to CHF 4'617'919.

Audit Report:

In the audit report from April 6, 2022, provided by BDO AG, Bern, no inconsistencies are mentioned, and the financial statement fulfills the legal requirements according to the SCS bylaws and the Swiss Civil Law.

The assembly approved the financial statement 2021 and the audit report unanimously with no abstention.

6. Discharge the Organs of the Society

The assembly discharged the board members and the financial audit unanimously with no abstention.

7a. Elections: SCS Executive Board (ExB) and BoD

- The assembly elected and confirmed Dr. Maud Reiter, Firmenich SA, unanimously as treasurer and member with signing rights in twos. As ExB member, she also takes a seat on the Board of Directors (BoD) ex-officio. She succeeds Hans Peter Lüthi.

7b. Elections: SCS Board of Directors (BoD) and Financial Audit

The assembly confirmed the elections of:

- Prof. Dr. Esther Amstad, EPFL Lausanne, as member and representative of the DPCI with no signatory right.
- Dr. Hans Peter Lüthi, as member and representative of the SCS Foundation. He keeps the signing rights in twos.

The following BoD members stepped down and the entries in the commercial register will be deleted with immediate effect.

- Prof. Dr. Harm-Anton Klok
- Dr. Benjamin Ries

The assembly approved the approach that, due to administrative reasons, the representative of the youngSCS is not elected as member of the board anymore but will be invited as guest if necessary.

The assembly confirmed BDO AG, Bern unanimously as audit instance for the financials 2022.

8. Membership fees

The annual membership fees 2023 were approved unanimously:

- Regular member	CHF	150.00
- Student member	CHF	50.00
- Retired member / unemployed members	CHF	80.00
- Institutional member (institutions)	CHF	800.00
- SCS Partnership (institutions)	CHF	3'000.00

Additional Fees for Divisions

- Industrial & Applied Chemistry - Regular	CHF	20.00
- Company	CHF	100.00
- Photochemistry Section - Regular	CHF	40.00
- Student	CHF	20.00

15% discount on collective memberships for university research groups.

9. News and Strategic Projects

The Board of Directors decided on the following, strategic initiatives that will be pushed in the coming months:

- Establish recently implemented networks like the ...
 - Material Sciences (Lead Maksym Kovalenko)
 - Chemical Ecology (Lead Matthias Erb)
 - Artificial Intelligence (Lead Thorsten Luksch)
- Industry jobs for PhD, Internships for MSc (Lead Hans Peter Lüthi)
- Further strengthen relationship to industry

After 2012 and 2016 a next SCS strategy retreat is planned in Summer 2022.

10. Event Outlook 2022

In 2022 twenty-three conferences and symposia took place or will take place either on-site or online under the direct organization of SCS. In addition, seven SCS Lectureship tours will take place.

The list of SCS events is updated regularly and is available on scg.ch/events.

11. Varia

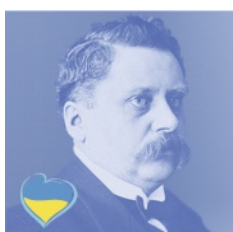
No requests to speak were requested from the audience. The President thanked for the confidence and closed the meeting.

Geneva, April 22, 2022

Prof. Christian Bochet
President

David Spichiger
Executive Director

SCS Foundation: Alfred Werner Scholarships for Ukrainian Students



The SCS Foundation, through its Alfred Werner Program, granted nine Ukrainian students of chemistry a stipend for their Master's studies at ETH Zürich and EPFL Lausanne. Most of the students, graduates of Kharkiv National University and Taras Shevchenko University in Kiev, are already in Switzerland. Once granted status S, they

will be doing internships before resuming their studies in September. Since the implementation of the SCS Foundation Alfred Werner program in 2013, six Ukrainian students received a scholarship. Heorhii V. Humeniuk, best of class in 2018 at the University of Geneva, is portrayed in the Alfred Werner Scholar Gallery. Earlier, the program has also supported a student refugee from Syria, who also completed his MSc studies at the University of Geneva.

Master of Science Studies of Chemistry in Switzerland

The program supports highly talented students to perform their Master of Science (MSc) studies in Chemistry, Biochemistry or the Pharmaceutical Sciences at a Swiss University or at one of the Swiss Federal Institutes of Technology. The stipends amount to CHF 30'000. The program is supported by the Swiss chemical and pharmaceutical industry as well as by a number of private donors. The SCS Foundation actively supports the integration of the Alfred Werner Scholars, offering mentorships, visits at the program-supporting industrial partners ("Meet and Greet" Program; see pages for each Class) and free access to the events of the Swiss Chemical Society. Between 2013 and 2020, 60 students from over 30 countries were granted an Alfred Werner Scholarship. Many of them continued their career in Switzerland; others went abroad again to experience more of this world. Some of the most senior scholars now work for Swiss companies. scs-foundation.ch

Chemistry Europe Award 2023 – Call for Nominations



With the Chemistry Europe Award, Chemistry Europe honors every two years scientists who have made outstanding contributions in a certain field. The topic of the award will be determined by the Chemistry Europe Council. This new prize will be awarded for

the first time in 2023 in the field of chemistry for sustainability, energy, materials, and the environment.

Nomination Process

Nominees for the Chemistry Europe Award should be scientists who have made major contributions to an area of chemistry and significantly advanced our understanding of a particular field.

The Chemistry Europe Award will be granted regardless of race, gender, age, religion, ethnicity, nationality, sexual orientation, gender expression, gender identity, presence of disabilities, and educational background. The prize may be awarded not only to members of the Chemistry Europe societies but also to non-members and representatives of any nation. Chemistry Europe Representatives are ineligible to receive this award.

Nomination deadline is November 1, 2022.

Source: chemistry-europe.onlinelibrary.wiley.com

Twelve young scientists find their way to the podium at the Swiss Chemistry Olympiad



From April 18 to 23, 18 teenagers flashed their Bunsen burners at ETH Zurich. The champions of the Swiss Chemistry Olympiad had competed against originally more than 400 participants. During the one-week national finals, they challenged each other for the podium places. The winners of the four gold medals will take part in the Inter-

national Chemistry Olympiad in July:

- Silas Waldvogel, Kantonsschule Schaffhausen (SH)
- Yannik Straumann, Berufsbildungszentrum Baselland (BL)
- Cédric Baerlocher Aguilar, Gymnasium Burgdorf (BE)
- Thomas Zaugg, Gymnasium Kirchenfeld (BE)

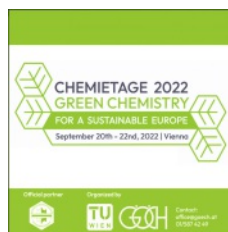
In addition, four silver and three bronze medals were given.

DE/AT/CH-Triangle instead of China

In July, the next challenge awaits the four winners: the International Chemistry Olympiad. This year's host country, China, is organizing the major event online due to the COVID pandemic. Instead of traveling to Tianjin, the Swiss team will meet at Lake Constance to take part in the competition together with their German and Austrian colleagues. Silas regrets that the International Olympiad is going online for the third time in a row, but at the same time he thinks it's still justified. He is looking forward to improving his skills even more, but is not putting any pressure on himself to win another medal. "I'm happy with my performance so far," he says, "anything beyond that is a bonus!". Incidentally, 2023 will be the first time Switzerland hosts the International Chemistry Olympiad.

Source: chemistry.olympiad.ch

Einladung zu den Chemietagen 2022 der Österreichische Chemische Gesellschaft in Wien



The Austrian Chemical Society cordially invites all SCS members to the Chemistry Days 2022 in Vienna. The conference will take place from September 20–22, 2022 at the Campus Gusshaus of the Vienna University of Technology. In the tradition of the joint conference, they are pleased to an-

nounce that the Slovak Chemical Society is the official partner this year.

For members of the SCS, reduced participation fees apply. Just fill in the name of the society and an identification number when registering.

Internationally recognised speakers from both universities and industry will be focusing on important questions relating to sustainability, energy storage, carbon capture and more.

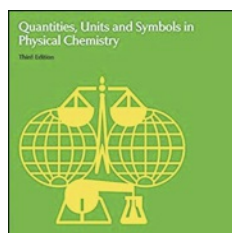
Deadlines:

Early bird discount bis 30. Juni 2022

Call for Abstracts offen bis 31. Mai 2022

Website: chemietage.at

IUPAC Green Book – Survey to contribute to release V5



The IUPAC Green Book, Quantities, Units, and Symbols in Physical Chemistry, provides a readable compilation of widely used terms and symbols from many sources together with brief understandable definitions.

IUPAC is currently working on a potentially major revision of the Green Book for the 5th edition (IUPAC project 2019-001-2-100) and the task group would like to consult as widely as possible about the content of the Green Book. The 4th edition which has been updated with the new SI will be published soon along with an abridged edition but with this 5th edition, the task group is considering more major changes.

Please fill in the survey to help the working group gather community views on what should be included in the 5th edition. The survey will remain open until the end of the summer but early replies will be very useful in planning.

For more details iupac.org/what-we-do/books/greenbook/

A Warm Welcome to Our New Members!



Period: 25.3.2022–25.4.2022

Frédéric Begnaud, La Roche sur Foron – Lena-Kristina Beiersdörfer, Unterägeri – Maryame Bina, Basel – Tzu Chin Chang chien, Basel – Si-Kai Chen, Geneva – Raffael Davenport, Allschwil – Marcel Drabbels, Lausanne – Léo Egger, Zofingen – Noga

Eren, Lausanne – Chiara Fabbretti, Zurich – Andrea Fin, Trana (IT) – Arthur Flaget, Geneva – Olusola Henderson Fredricks, Yaba, Lagos (NG) – Giulio Gasparini, Satigny – Denis Gribkov, Stein – Sandrine Hell, Allschwil – Michael Hofstetter, Villigen – Philip Hope, Zurich – Xueqian Hu, Belfaux – Guillaume Journot, Zofingen – Isabelle Kolly, Meyriez – Antoine Konter, Annemasse (FR) – Maria Korpidou, Basel – Baptiste Leforestier, St Julien den Genevois (FR) – Kaidi Li, Geneva – Sensheng Liu, Geneva – Christeena Mathew, Lausanne – Philippe-Alexandre Poisson, Geneva – Francesco Russo, Geneva – Saidbakhrom Saidjalolov, Geneva – Nidal Saleh, Geneva – Sylvain Sudan, La Tour-de-Peilz – Sylvain Taillemaud, Satigny – Meiling Tan, Geneva – Cecilia Tortoreto, Zofingen – Jasmine Viger Gravel, Geneva – Samuel Yasmin, Bern – Ke-Feng Zhang, Geneva – Dominik Zürcher, Zurich.

HONORS, AWARDS, APPOINTMENTS

Chemistry Europe announces Fellows Class 2020/21 Honoring the European Spirit



Chemistry Europe, an association of 16 chemical societies from 15 European countries publishing a family of high-quality scholarly chemistry journals and the ChemistryViews magazine, is pleased to announce its newest class of Fellows. The Class 2020/21 consists of 27 individuals. Awarded bi-annually since 2015, the Fellows program honors exceptional members of the Chemistry Europe societies who have made a significant contribution to Chemistry Europe through their support, research, creativity, and innovation.

This year's class of Fellows honors:

Honorary Chemistry Europe Fellows:

Eva E. Wille (Germany) and Peter Göllitz (Germany)

Chemistry Europe Fellows, Class 2020/21:

Lutz Ackermann (Germany), Carlos A. M. Afonso (Portugal), Angela Agostiano (Italy), Nicola Armaroli (Italy), Pablo Ballester (Spain), Tatiana Besset (France), Vlasta Brezová (Slovakia), Radek Cibulka (Czech Republic), Ivana Čísařová (Czech Republic), Fernando P. Cossío (Spain), Jeanne Cressous (France), Damien Debecker (Belgium), Céilia Fonseca Guerra (The Netherlands), Sonja Herres-Pawlis (Germany), Patrik Johansson (Sweden), Péter Kele (Hungary), Christoforos Kokotos (Greece), Janusz Lewiński (Poland), **Stefan Matile** (Switzerland), Belén Martín-Matute (Sweden), Nuno Maulide (Austria), Tatjana Parac-Vogt (Belgium), Floris Rutjes (The Netherlands), **David Spichiger** (Switzerland), Anabela A. Valente (Portugal).

Chemistry Europe Fellows from Switzerland

Prof. Stefan Matile, University of Geneva and David Spichiger, Swiss Chemical Society join the Swiss class of Chemistry Europe Fellows that now includes the following community members:

- 2020/2021
- Prof. Stefan Matile, University of Geneva
 - David Spichiger, Swiss Chemical Society
- 2018/2019:
- Prof. Katharina Fromm, University of Fribourg
 - Prof. Karl Gademann, University of Zurich
- 2016/2017:
- Prof. E. Peter Kündig, University of Geneva
 - Prof. Michael Grätzel, EPFL Lausanne
 - Prof. Karl-Heinz Altmann, ETH Zürich
- 2015:
- Prof. Francois Diederich, ETH Zurich
 - Prof. Helma Wennemers, ETH Zürich
- More details: chemistry-europe.onlinelibrary.wiley.com and scg.ch/component/page/ce-fellowship

Prof. Thomas Rizzo, EPFL, has been awarded one of the three Advances in Measurement Science Lectureship Awards from the ACS.



Co-sponsored by ACS Sensors, Analytical Chemistry, Journal of Proteome Research, and the ACS Division of Analytical Chemistry, the Advances in Measurement Science Lectureship Award recognizes individuals who have made a recent and major impact in the field from three major geographic regions: the Americas; Europe, The Middle East,

and Africa; and Asia-Pacific.

Representing Europe, The Middle East, and Africa, is **Prof. Thomas Rizzo** at EPFL's School of Basic Sciences. Professor Rizzo directs the Laboratory of molecular physical chemistry within the Institute of Chemical Sciences and Engineering (ISIC). His research currently focuses on combining vibrational spectroscopy, ion mobility and mass spectrometry in a single, user-friendly instrument for biomolecular analysis.

"This award means a lot to me because I don't originally come from the analytical chemistry community, having been educated as a physical chemist," Rizzo told ACS Axial. "It also says a lot about the mass spectrometry community, that they are open to new ideas and people rather than being closed and cliquish."

Source: actu.epfl.ch

Prof. Michael Grätzel, EPFL Lausanne, ranked #1 chemical scientist in the world



Research.com, a prominent academic platform for scientists, has ranked **Prof. Michael Grätzel** at EPFL Lausanne as first in its scientists ranking for Chemistry. Their ranking is constructed using H-index data gathered by Microsoft Academic and includes only prominent scientists with an H-index of at least 40 for scientific papers.

About Prof. Michael Grätzel

Professor Grätzel is world-renowned for inventing the first dye-sensitive solar cell in 1991 with chemist Brian O'Reagan. Just as plants use chlorophyll to turn sunlight into energy, the "Grätzel cells" use industrial dyes, pigments or quantum dots stimulated by sunlight to transmit an electrical charge. Within fifteen years of the original invention, Grätzel evolved the cells into an applied technology that is now being developed in universities and companies worldwide. Having discovered molecular photovoltaics, Grätzel's research has focused on designing mesoscopic photosystems based on molecular light harvesters that convert light very efficiently to electricity. He is credited with moving the photovoltaic field beyond the principle of light absorption via diodes to the molecular level. Recently his research engendered a second revolution in photovoltaics prompting the advent of perovskite solar cells. Within only one decade their power conversion efficiency increased from 3 to over 25% rivaling and even exceeding the performance of conventional photovoltaics.

Grätzel also applied his innovative mesoscopic design concept to enhance the power of lithium-ion batteries and to create photoelectrochemical cells that efficiently generate chemical fuels from sunlight, opening up a new path to provide future sources of renewable energy that can be stored.

Source: actu.epfl.ch

Gisbert Schneider, ETH Zurich receives Gmelin-Beilstein Award from the GDCh



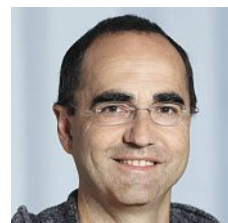
The German Chemical Society (GDCh) awards **Prof. Gisbert Schneider**, ETH Zurich, the Gmelin-Beilstein commemorative coin. The award will be presented at the 17. German Conference on Cheminformatics and EuroSAMPL Satellite Workshop, the annual meeting of the GDCh Division 'computers in chemistry' in Garmisch-Partenkirchen

on May 9, 2022.

The Gmelin-Beilstein commemorative coin, a silver medal associated with a certificate and prize money of 7'500 EUR, is awarded by the GDCh to national and international personalities who have made special contributions to the history of chemistry, chemical literature or have acquired the chemistry information. Prof. Gisbert Schneider is one of the best-known scientists in the field of chemical information and cheminformatics and is considered a pioneer of today's artificial intelligence approaches in drug design. He receives the award for his pioneering work in integrating machine learning methods into practical medicinal chemistry. It was also Schneider who coined medicinal chemistry with the terms "scaffold-hopping" and "frequent hitter", which have become indispensable in today's specialist vocabulary.

Source: chab.ethz.ch

Prof. Jean-Christophe Leroux, ETH Zurich, receives the Maurice-Marie Janot Award 2022 and the Samyang CRS Award 2022



The Maurice-Marie Janot Award 2022 is given to **Prof. Jean-Christophe Leroux**, ETH Zurich, for his important fundamental and applied contributions to the fields of biomaterials and drug delivery, and for his involvement in the development of innovative bio-detoxification systems for the treatment of metabolite disorders. The award recognizes

an individual researcher, also in the context of a team, for her/his contributions to the field of Pharmaceuticals, Biopharmaceutics and Pharmaceutical Technology.

Prof. Jean-Christophe Leroux also received the Samyang Award 2022 in honor of Sung Wan Kim, that is given by the CRS (Controlled Release Society) to experts dedicated to the delivery of drugs, cosmetics, flavors, fragrances, pesticides and other actives.

Source: chab.ethz.ch, apgi.org, controlledreleasesociety.org

JOURNAL NEWS

Helvetica, Volume 105, Issue 4, April 2022



Research Articles

Circularly Polarized Luminescence of [6] Helicenes through Excited-State Intramolecular Proton Transfer

Dominik Göbel, Sandra Míguez-Lago, Maria Jose Ruedas-Rama, Angel Orte, Araceli G. Campaña, Michal Juríček

W-oxo Adamantylidenes: Stable Molecular Precursors for Efficient Silica-Supported Metathesis Catalysts
Darryl F. Nater, Maxime Boudjelel, Lukas Lätsch, Richard R. Schrock, Christophe Copéret

Generation of Cyclopentadiene for Diels–Alder Reactions by Visible-Light Irradiation of Iron Sandwich Complexes
Alexey S. Sokolov, Alexander V. Polezhaev, Yulia V. Nelyubina, Dmitry S. Perekalin
Website: onlinelibrary.wiley.com/journal/15222675

INDUSTRIAL NEWS

Source: www.chemanager-online.com

Novartis Creates new Innovative Medicines Unit

April 5, 2022: Swiss pharma powerhouse Novartis is merging its pharmaceuticals and oncology businesses into a new unit called Innovative Medicines (IM). The restructuring that will create separate US and International commercial organizations is expected to increase focus, strengthen competitiveness and drive synergies in high-value medicines. The new model will also help bring increased focus and commitment to its core therapeutic areas of cardiovascular, hematology, solid tumors, immunology and neuroscience the Basel-based drugmaker said. The two global units will have full profit and loss responsibility across all therapeutic areas and ownership of customer experience, marketing and sales, and market access for their respective markets. The company expects to achieve selling, general and administrative (G&A) savings of at least \$1 billion to by 2024 as a result of the reorganization. Through elevation and establishment of an independent US commercial organization, Novartis said it will be able to quickly achieve its goal of becoming a top-five company in the United States in terms of sales while maintaining and growing its leadership position internationally. Overall, the focus will be on strengthening the pipeline. A new strategy and growth function, to be led by a still to be appointed chief strategy & growth officer, will combine corporate strategy and R&D, while a new operations unit will link technical operations and customer & technology solutions units. G & A functions are planned to be globally integrated. Value creation through the operational improvements should ensure at least 4% sales growth in constant currency through 2026, Novartis believes. It also expects to deliver at the high end of its IM margin guidance of “high 30s” in the medium term and 40% or more in the mid- to long-term. “The simpler organizational model is central to Novartis’ growth strategy as it will make us more agile and competitive, enhance patient and customer orientation, unlock significant potential in our R&D pipeline and drive value-creation through operational efficiencies,” said CEO Vas Narasimhan. With its portfolio of in-market medicines and up to 20 major pipeline assets that could be approved by 2026, the company is in a strong position to deliver above-peer-median sales and margin growth in the mid- and long-term,” he added. Marie-France Tschudin has been named president and chief commercial officer of Innovative Medicines International and Victor Bulto as IM president in the US. Steffen Lang will serve as president of operations and Shreeram Aradhye – who is returning to Novartis after executive stints at other drugmakers – will be president of global drug development and chief medical officer. Susanne Schaffert, president, oncology, Robert Weltevreden, president, customer & technology solutions and John Tsai, president, global drug development and chief medical officer, will leave the company.

Six Firms to Make Vaccines for German Emergency Supply

April 12, 2022: Germany’s economics ministry has budgeted up to €2.9 billion (\$3.14 billion) to ensure sufficient supply of mostly mRNA-based Covid-19 vaccines to be able to deal with the ongoing pandemic and any future outbreaks up to 2029. Six companies announced this week that they have been selected for the scheme. In addition to the now-mRNA giant BioNTech, companies participating include the team of German chemical producer Wacker with compatriot drugmaker CordenPharma and the German-British partnership of CureVac and Glaxo-SmithKline, along with, separately, Germany’s IDT Biologika and Swiss-German biotech Celonic. The contracts were negotiated on behalf of the German ministry of health. Further administration and management will be undertaken at the Center for Pandemic Vaccines and Therapeutics at the Paul-Ehrlich-Institut (ZEPAI), for which this ministry will have responsibility. Under the agreements, Berlin will have access rights to the companies’ production capacities if the coronavirus pandemic persists or a new pandemic breaks out. Clauses contain arrangements stipulating vaccine supply and production for the national distribution scheme. The companies will receive an annual standby fee for keeping capacity available, starting in 2024 and ending in 2029. Terms for all the participating firms foresee making a potential 80 million doses per year. Wacker and CordenPharma said the government also has taken an option to increase the contracted volume to 100 million doses annually. “There is growing evidence that viral pandemics will continue to pose a public health challenge for years. This contract with the German government will ensure significant supply of vaccine doses to address potential public health threats by 2027,” said Sean Marett, chief business and chief commercial Officer at BioNTech. Wacker is currently expanding its biotech site at Halle, Germany, to create center for mRNA. “We are creating capacity not only for pandemic preparedness, but also beyond that,” Susanne Leonhartsberger, head of Wacker Biosolutions, commented. The German chemical producer had earlier signed a deal with CureVac to help manufacture that company’s mRNA Covid vaccine candidate called CVnCoV, but this was canceled when the Tübingen-based biotech pulled the project from the European Medicines Agency’s approval process last year. Since then, CureVac has been focusing on an adjuvanted vaccine candidate called CV2CoV it is developing together with GSK. The pair will also produce 80 million doses for the German reserve. Considering the unpredictable and variant-driven course of the Covid-19 pandemic has underscored the importance of having access to innovative technology platforms, such as mRNA technology, as well as corresponding robust manufacturing capacities, said CureVac CEO Franz-Werner Haas. Maryland, USA-based IDT Biologika (IDT), which makes a vector vaccine, produced Covid doses for AstraZeneca and Johnson & Johnson pharma arm Janssen and also established drug substance production for the first inactivated Covid vaccine from Valneva in “just a few months,” as it notes. Celonic based in Basel, Switzerland, operates production facilities in Heidelberg, Germany as well as Basel for clinical and commercial production of biological agents, mRNA and protein-based vaccines. Since 2020, CEO Konstantin Matentzoglou said, the company said it has invested a “high double-digit million euro sum” at the site. In its new 5000 m² production facility at Heidelberg, Celonic can produce up to 200 vaccine batches at a 2000-liter scale, equivalent to as many as 500 million vaccine doses. As part of the pandemic preparedness project, the company said it will prepare for a potential demand in the first phase and then have the capacity ready.

Catalent to Invest in UK Biologics Capabilities

April 13, 2022: Catalent has acquired a 174,000 m² biologics development and manufacturing facility currently being built by Vaccine Manufacturing and Innovation Centre UK (VMIC) on the Harwell Science and Innovation Campus south of Oxford, England. After taking over the site for an undisclosed sum, the New Jersey, USA-based CDMO said it plans to invest up to £120 million (\$160 million) to complete construction and add capabilities for development and manufacture of biologic therapies and vaccines, including mRNA, proteins and other advanced modalities. Employing more than 400 people, the new facility will support public and private organizations seeking to develop and manufacture biotherapeutics, Catalent said. The US company has a long-standing presence in the UK, where its workforce already exceeds 1,300 people at four facilities focused on development and manufacturing of oral dose forms. In addition to a clinical trial supply site in Bathgate, Scotland, the Catalent Biotherapeutics network already has a UK presence at Nottingham, Swindon, Haverhill, and Dartford, England, as well as at sites in Italy, Belgium, France, Switzerland and the US. Commenting on the new acquisition, Mike Riley, president of Catalent Biotherapeutics, said it “will allow the company to collaborate with the rich academic and biomedical science community centered around Oxford and will result in a facility that provides opportunities to transform innovation into real treatments for patients across the United Kingdom, Europe and beyond.” Catalent’s priority, Riley said, is to complete construction as soon as possible to be able to commence customer programs in 2022. “We will then integrate its capabilities within our existing network of biologics facilities across Europe to offer a flexible range of manufacturing, technology and development solutions for the pipeline of thousands of development programs currently underway.” Robin Shattock, head of Mucosal Infection and Immunity at Imperial College London and chair of the VMIC board, told the VMIC workforce that the deal “ensures that the site, when completed, will stay true to the original purpose of strengthening the UK’s vaccine manufacturing capability by bringing innovation to the sector and getting more vaccines to the clinic.” While Shattock said Catalent “has the resources to ensure the facility can become operational and start contributing to the UK’s and Europe’s vaccines landscape at pace,” the sale to a US private company did not sit well with all in the UK, especially as VMIC had been funded by the British taxpayer to the tune of £215 million. Founded by the UK government in 2018, before the coronavirus pandemic began and conceived as a national emergency preparedness center, the nonprofit VMIC was initially planned to work toward developing vaccines against Ebola and Lassa fever. Later, it was expected to produce doses of AstraZeneca’s Covid vaccine. In a letter published in the British Medical Journal, a group of scientists from the UK and Ireland called the government’s decision to privatize the facility “baffling” and “ridiculously short-sighted.” The sale, they said, leaves the UK “much less ready” for future pandemics. Quoting government remarks that vaccine manufacturing already has been taken over by industry and that the cost of completing the center had increased beyond what had been expected, the letter writers expressed skepticism that a private company would be prepared to take a long-term perspective for a country’s preparedness. The UK experienced a substantial loss of vaccine capabilities during the 1980s and 1990s after leading players such as the Wellcome Foundation and Glaxo moved away and took their vaccine expertise to other countries, the scientists noted.

Dow Takes Stake in German LNG Terminal

April 14, 2022: With all European energy discussions now focusing on dramatic cuts in supplies of Russian gas, Dow Chemical is taking an undisclosed minority stake in an import ter-

minal for US liquefied natural gas (LNG) that is planned to be built on its own chemical complex at Stade on the German North Sea coast. Along with land, Dow will also contribute infrastructure services, off-gas heat, site services and mutual harbor use rights to the project expected to be completed by 2026. The terminal also will repurpose off-gas heat at the Dow site for the carbon emissions-free regasification of the liquefied gas back to its gaseous state, the group with European headquarters at Horgen, Switzerland, said. A final investment decision is expected by 2023. With a projected regasification capacity of 13.3 billion cubic meters of gas per year, the chemicals giant said the harbor facility to be operated by Hanseatic Energy Hub GmbH (HEH), a consortium, of Dow, Fluxys, Partners Group and Buss Group, could satisfy up to 15% of Germany’s current natural gas requirements annually. Additionally, it could meet nearly 25% of the recent US commitment to increase LNG supplies to Europe. Under the influence of the increasingly brutal war in Ukraine, the European Commission and the US in March signed an agreement on European Energy Security. This calls for shipment of 50 billion cbm of US-made LNG from various American ports to Europe by 2030 to substitute Russian gas. “This collaboration to construct an LNG import terminal in Germany takes a major step in enabling a stable, cost-effective and sustainable supply of energy to Europe,” said Neil Carr, president of Dow Europe, Middle East, Africa and India. “For Dow, this allows us to make a significant contribution to transforming the energy supply in Germany in support of its 2045 climate targets while increasing the competitiveness of Stade, a site important for serving Dow customers throughout Europe.” Carr was referring to plans to Germany’s plans, drawn up before the Russian invasion of Ukraine, to transition away from fossil fuels toward renewable energy sources after already phasing out coal and nuclear power. The war has left the country’s government with no choice but to pivot away from the recently completed but not yet commissioned Nord Stream 2 gas pipeline connecting it with Siberian gas fields. Calculations show that Germany currently draws about half of its natural gas via pipeline from Russia. Up to now, it has had no LNG regasification and import facilities. As the Russian pipeline neared completion, the government of former chancellor Angela Merkel rejected a proposal by former US president Donald Trump to switch to buy US-made LNG instead.

Expanding Into Oligonucleotides

Bachem Invests, Leverages Expertise and Equipment to Support the Development of Novel APIs

April 15, 2022: The global market for oligonucleotide therapeutics is expanding rapidly. Bachem, an innovation-driven company based in Bubendorf, Switzerland, has entered this competitive environment a few years ago and meanwhile has passed certain milestones on its way to become a preferred oligonucleotide manufacturing partner for pharmaceutical companies. Extending its focus from peptides to oligonucleotides will also lead to a transformation of Bachem’s organization. Seamus White, business development manager at Bachem, provides an update on the company’s strategy and progress in the field of oligonucleotide manufacturing.

CHEManager: Bachem’s journey into oligonucleotides initially started in 2018. What led to the decision to enter this field?

Seamus White: The potential of oligonucleotide-based medicines is finally receiving the focus it deserves. Rare diseases, especially, are benefiting from these molecules. This demand will get even greater as oligonucleotide therapeutics move more into chronic diseases, too. However, there are significant unmet needs in the field — revolving around capacity, cost-effectiveness, and sustainability. Thus, we saw an opportunity to expand Bachem’s customer base by leveraging existing expertise and

equipment and to ultimately support the development of novel active pharmaceutical ingredients. As the leading company in developing and manufacturing peptides and oligonucleotides and an API manufacturer, we are offering the best solutions for today and are developing tomorrow's innovations. We work with passion and dedication to support our customers in achieving breakthrough medical advances that will significantly transform patients' lives, and we will address larger-scale patient populations and indications by transforming the processes of how oligonucleotide therapeutics are supplied.

What are Bachem's achievements in oligonucleotides so far?

S. White: We started by purchasing and installing off-the-shelf synthesizer and invested considerable resources in the design of a custom-built cleavage and deprotection system. This setup is used for complex siRNAs synthesis in multi-hundred-gram quantities. A first GMP batch for clinical investigations was released in 2019. In 2021, we completed the qualification of the pilot plant dedicated to the downstream processing of oligonucleotides. This will allow us to efficiently process material under GMP conditions in the single-digit-kg range. Recently, we completed the installation of our first large-scale equipment train for oligonucleotides. The line has been designed for the processing of multi-kg batches, and we have already started using it in collaborations with some pharma and biotech companies.

What differentiates Bachem from other CMOs in the oligonucleotide market?

S. White: With 50 years' experience in the development and manufacturing of innovative medications, with customer-centric excellence, we have proven to be a trusted and reliable partner for pharmaceutical and biotech companies. With our tailored approach, we are committed to serving customer's needs and ultimately always have patients in mind. Because of this, we keep innovating and developing new technologies! We want to transform the oligo field by bringing solutions to our partners for scalability, cost-effectiveness and sustainability. We will bring innovation to every piece of equipment and processes — from solid-phase synthesis to downstream processes.

Can you share some information on process innovations used for your oligonucleotide manufacturing?

S. White: At Bachem, we have mastered the art of large-scale solid-phase synthesis, chromatographic purification and lyophilization with tailor-made engineering solutions over decades. We now find that some of these solutions can be adapted for oligonucleotides. An example is the MCSGP technology for the purification of crude materials in a continuous chromatography mode. MCSGP is short for multi-column countercurrent solvent gradient purification, which is a chromatography method that is used to separate or purify biomolecules. We have introduced this technology for peptide APIs and meanwhile demonstrated feasibility for oligonucleotides as well. We are convinced that MCSGP technology will be cost effective and reduce waste substantially. We are also working on multi-faceted solutions to make the oligonucleotide synthesis process more scalable and more sustainable. Here, we are trying to leverage our scientists' experience in protecting-group chemistry and in solid-phase synthesis.

What lies ahead for the oligonucleotide market?

S. White: With 14 oligonucleotide medicines already approved by the FDA and the EMA, these products are now delivering on their promise of curing rare diseases. Furthermore, we see that the pace keeps increasing with about 200 clinical trials and more than 600 preclinical trials for oligo-based products. The market keeps growing as well as the demand, so we want

to keep pace with these changes and truly help our pharma and biotech partners develop and manufacture their oligo-based therapeutics that will transform patients' lives.

How will Bachem respond to the increasing market demand?

S. White: Simply put, we keep investing in our manufacturing capabilities and capacities for peptides and oligonucleotides. Worldwide, we will invest in the next few years about \$ 500 million in new equipment and production facilities. At the Buben-dorf site specifically, we started the construction of a brand-new Tides manufacturing building which will house additional equipment trains for the production of oligonucleotide-based APIs at commercial scale.

What do you foresee for oligonucleotide therapeutics and where will Bachem position itself in this field?

S. White: With the increasing use of oligonucleotide therapeutics, advances in scalability and sustainability of oligo manufacturing are key for the coming years. As a matter of fact, we have launched an internal innovation program to address these challenges. In addition to large-scale and sustainable manufacturing, we see a steady evolution in medicinal chemistry and oligonucleotide conjugation. The molecules tend to become more and more complex featuring various backbone modifications and new conjugation moieties to address pharmaceutical targets located also outside of the liver. We are in a great position to support this trend with relevant experience in conjugation chemistries for peptides, lipids, PEGs et cetera, and expert analytical capabilities. We will help enabling the benefits of oligonucleotide treatments to expand from rare to chronic diseases — and into more therapeutic indications. Ultimately, we want to use our proven innovation to transform lives — the lives of everyone we work and partner with — and ultimately of course, the lives of patients.

After the Big Covid-19 Storm: A Look on Upcoming Highlights in the Pharmaceutical and Biotech Industry in 2022

April 19, 2022: What does 2022 hold for the biopharma industry? Which companies can play at the forefront in terms of products as well as business? Covid-19 will continue to be a dominant topic. But other indications are also likely to come back into focus. The Covid-19 crisis has taken the pharmaceutical and biotech industry to a new level: Some companies played an important role in managing the pandemic and demonstrated their innovation potential. Billions of euros and dollars have flowed into the industry. Their public reputation has improved greatly. Now the question is: What does 2022 hold for the biopharma industry? Which companies can play at the forefront in terms of products as well as business? Covid-19 will continue to be a dominant topic, but other indications are also likely to come back into focus. Last but not least, things will be interesting on the financing side now that the pandemic bubble has burst, and the share prices of many biopharma companies have fallen sharply. Looking ahead is always also looking into the crystal ball. It is based on an analysis of past developments, the current situation and assumptions. By its very nature, looking ahead cannot predict future developments by 100%. But it does give an idea of the developments that can be expected with a certain degree of probability. Evaluate, an analysis and consulting firm specializing in pharmaceutical and biotech topics, has taken a look ahead for this industry with its Evaluate Vantage 2022 report. The study provides information for company managers and employees in the industry, for healthcare experts as well as for investors.

The Windfall of Covid-19

The report concludes that Covid-19 will still be a front-page story in 2022. “That spotlight should bring some benefits, largely in the shape of broad support — and a lot of money — from investors. But it also means heightened scrutiny, particularly for those that are making billions from successful pandemic vaccines and treatments.” According to the study findings, there is almost unanimous agreement among industry experts that vaccines against Covid-19 will continue to make billions this year for BioNTech, Pfizer and Moderna, with these firms’ jabs expected to bring in at least \$ 50 billion in combined revenue. The huge success of Comirnaty will make the pharma giant Pfizer the world’s biggest drug maker by prescription sales in 2022. The Covid-19 vaccine is expected to generate at least \$ 29 billion in sales this year, accounting for almost half of the company’s projected prescription sales. This also means that BioNTech, the German biotech showcase company, will benefit significantly from Comirnaty. After revenues of up to € 17 billion in 2021, the company expects sales of similar magnitude in 2022. This success has catapulted the Mainz-based company into the international top league within a very short time. By cooperating with Pfizer, the BioNTech management has taken a strategically important step. The collaboration made the expertise of a global corporation as well as global attention available to BioNTech. However, the Corona euphoria does not last forever, as can be seen from BioNTech’s share price: since its high of € 375, the valuation has more than halved. But management has proven that it is capable of developing and marketing innovative products in a structured manner. And the mRNA technology, that much is clear, offers numerous other potential applications. The US counterpart in mRNA vaccine development, Moderna, is playing in a similar league. The Evaluate study indicates that the company took a while to get manufacturing ramped up, so 2022 sales of its vaccine are expected to surpass those booked in 2021. It’s Covid-19 vaccine Spikevax is the only reason the biotech is being featured in the analysis. The Tübingen, Germany-based biotech company CureVac, on the other hand, plays no role in this analysis following the failure of its Covid-19 mRNA vaccine candidate. Although the company has been in existence for 22 years and has always proclaimed its pioneering role in mRNA technology, it has not yet brought a product to market. Already in 2017, CureVac had to admit the failure of an mRNA-based drug candidate against prostate cancer. All current pipeline candidates are at an early stage of development and thus still far from a potential market entry. The company’s main focus now is on developing a next-generation Corona vaccine, but recent reports indicate that this project is also at risk of delays and the company may make a technology shift. In the meantime, the head of technology has left the company, while the CEO remains on board. Due to all these events, much trust has fallen by the wayside — the share price collapse speaks for itself. In contrast, another Tübingen-based biotech company could emerge from the shadows in the future. Immatix announced in December 2021 that it has entered into a global license agreement for its TCR bispecific program IMA401 with Bristol Myers Squibb (BMS). The development program targets a highly prevalent antigen in multiple solid tumors and activates T cells. In preclinical studies, IMA401 has shown anti-tumor activity with complete remissions.

World’s Biggest-selling Drugs

Outside of pandemic-related products, the Evaluate report forecasts Humira to cling on its crown as the biggest selling drug. However, 2022 will be the last year of largesse for AbbVie’s anti-rheumatic, with biosimilars due to arrive in the US in 2023. This will hand pole position to Keytruda. The fact that Merck & Co’s cancer antibody is still generating billions of dollars in

new sales each year is a testament to the company’s success in broadening the drug’s label. In addition, Revlimid, an immunomodulator for the treatment of multiple myeloma, and Opdivo, a checkpoint inhibitor for the treatment of various tumors, will continue to be mega blockbuster brands. Among the few European companies expected to play a significant role in the current year, Sanofi appears in the analysis along with its US cooperation partner Regeneron. The companies can continue to rely on revenues from Dupixent, a treatment for severe dermatitis. Furthermore, recent sales drivers include the European companies Novo Nordisk with Ozempic and AstraZeneca with Tagrisso.

Products and Indications

In addition, there are a number of potential new products that could be ready to launch this year and generate high sales in the medium term, with Alzheimer’s disease poised to provide plenty of regulatory news. Lilly and Roche are striving to join Biogen on the market with their respective projects. With two big hopes in the pipeline for approval next year, BMS is under pressure to convince investors that it can avoid the fast-approaching patent cliff on Revlimid. For Germany, the Association of Research-Based Pharmaceutical Companies (VFA) expects more than 45 drugs with a new active ingredient coming on the market this year. This means that 2022 is also likely to be another record year. More than a quarter of the new therapies will be directed against infectious diseases, another quarter against cancers. New treatments are also expected for rare genetic defects.

The Costs of Research

Another way to identify the projects that are likely to be in focus is to look at biopharma’s most costly development programs. According to the report, disease areas that require vast and lengthy cardiovascular outcome trials to prove a drug’s safety will always come out on top in this sort of analysis. Hence the appearance of Lilly’s Tirzepatide and Novartis’s Pelacarsen; whether any interim readout will happen for the latter project remains a topic of interest for the Swiss pharma giant’s investors. Roche has run a larger program with Gantenerumab than other amyloid-beta mAb (monoclonal antibody) developers and, therefore, has more to lose in terms of costs incurred than competitors should the winds of Alzheimer’s disease shift. Islatravir is Merck & Co’s big bet in the long-acting HIV antiviral space, though safety concerns emerged in late 2021. Elsewhere, success in respiratory syncytial virus infections (RSV) is hugely important for GlaxoSmithKline (GSK), which is struggling to revive investor support.

Hurdles and Trends

To get this financing on track, however, the industry must overcome a number of hurdles. In this regard, pharmaceutical information service Informa Markets points out that supply chain problems in the biopharma sector will continue to plague the industry in 2022. There will also be increasingly compressed timelines for technical transfers, and European pharma policy revisions could probably be in a pivotal year. Moreover, the Covid-19 pandemic has forced pharma companies to become more agile and open-minded in approaching drug discovery and development, including managing evolving clinical trials. In this context, Sujay Jadhav, CEO of Verana Health, points out that the adoption of artificial intelligence (AI) in the pharmaceutical industry has long been in its nascent stages. But in 2022, the industry will benefit from new insights in understanding patients and diseases thanks to advances in AI. Jane Z. Reed, director life sciences at Linguamatics, an IQVIA company, adds, that 2021 proved to be a pivotal year for the adoption of data science in the pharmaceutical industry for drug discovery and development. And Jim Robbins, senior vice president of life sciences

at Arcadia, a healthcare data and software company, points out that life science researchers will be investing more in pharmacogenomics in 2022 because genetic mutations play an important role in many diseases.

How to Invest all the Money

Covid-19 and the billions in sales some companies are making from pandemic products raise the question of what companies intend to spend those windfall profits on in 2022. Based on the Evaluate report many biopharma watchers are expecting an uptick in M&A this year. Another likely trigger for these transactions is lower valuations in the wake of the difficult months on the stock market. The authors of the report emphasize that the US and European biotech sectors began 2022 in a bear market as the pandemic bubble burst and investors looked for Covid-19 recovery stories in other sectors. The highs of the pandemic era could never be maintained, and many consider the current retrenchment part of the cycle. Although the Covid 19 party appears to be over for shareholders, there is much to look forward to in terms of new products, candidates and sales in 2022 — and beyond.

Sandoz Launches Generic Combigan Drops

April 19, 2022: Novartis subsidiary Sandoz has launched a generic version of Combigan, the ocular hypertension drug made by AbbVie's Allergan arm. The copy of the off-patent eye drops will be marketed only in the US, where Allergan racked up sales of \$ 373 million with the original product in 2021. The newly launched maleate ophthalmic solution, which goes by the generic name of brimonidine tartrate/timolol, be sold by Sandoz in the dosing strengths 0.2%/0.5%. According to US reports, the Basel, Switzerland-based generics maker plans to offer the drug at a 10% discount off the originator's wholesale acquisition price. This will be the second patent-free competitor for Combigan. Apotex launched its own version in January this year, shortly before its patents lapsed. "Fixed combinations of medicines to treat ocular hypertension can offer patients enhanced convenience, improved adherence, reduced exposure to preservatives, and cost savings," said Sandoz president Keren Haruvi. Sandoz, Haruvi said, launched "this important generic eye treatment in-house to expand patient access to high-quality, more affordable eye care for millions of US patients." The Novartis subsidiary sees itself as a leading provider of ophthalmic medicines in the US, offering more than 36 product families for the treatment of a wide range of eye diseases. These include Timoptic and Alphagan P, the two components used in Combigan. With the launch of the bimonidine tartrate/timolol maleate drops, Sandoz said it will retain its number one position in that market. Novartis is in the midst of a strategic review to decide whether or not to spin off its generics franchise. Sandoz reportedly has generated considerable interest from potential buyers. The parent company, also Basel-based, is giving itself until mid-2002 to decide. In the run-up to the decision, Sandoz continues to launch new products, including a generic version of Bristol Myers Squibb's top-selling multiple myeloma therapy Revlimid, which it rolled out in 19 European countries in February. In March, the company agreed to acquire British drug delivery device developer Coalesce Product Development, a specialist in generic respiratory treatments. Apart from the Sandoz sale, pharma watchers are also following plans by Novartis to reduce its work force. According to unconfirmed Swiss reports, the drugs giant could shed at least 1,000 jobs in its home market.

The Upswing of the Superstars: The Chemical Industry Has Shown Resilience to the Crisis – Now it Must Get Fit for the Future

April 19, 2022: For its annual report "Value Creation in Chemicals 2021 – Ten Years of Steady Growth – and a Few Superstars,"

the strategy consultancy Boston Consulting Group examined the performance of leading international chemical companies from 2011 to 2020. The long-term perspective shows that the industry has mastered serious market downturns with astonishing confidence.

Rising oil prices, the Covid-19 pandemic with its unprecedented drop in demand, and finally the supply shock — the recent crises have hit the chemical industry hard. Sales and profits plummeted, and share prices went into a tailspin. But the industry demonstrated unexpected resilience. The chemical sector was among the first to recover — an indicator of a general economic upturn in many regions.

For its annual report „Value Creation in Chemicals 2021 — Ten Years of Steady Growth — and a Few Superstars,“ the strategy consultancy Boston Consulting Group (BCG) examined the performance of leading international chemical companies from 2011 to 2020. The long-term perspective shows that the industry has mastered serious market downturns with astonishing confidence. For the 69 large-cap companies in the chemical industry — these are publicly traded companies with a market capitalization of more than \$ 7 billion — the median annual total shareholder return (TSR) from 2011 to 2020 was 12%, while the median value for all sectors was 11%. TSR accounts for the change in share price and any other effects on shareholders' net wealth, like dividends. It is driven by three factors: Firstly, by the combination of revenue growth and change in EBITDA margins as an indicator of a company's improvement in fundamental value. It uses secondly the change in the company's valuation multiple to account for the impact of investor expectations. Thirdly the model tracks the distribution of free cash flow to investors and debt holders in the form of dividends, share repurchases, and repayments of debt. For the deep dive of the above-mentioned study, BCG once again significantly expanded the range of the investigation and examined the performance of 238 chemical companies with a market capitalization of more than \$ 1 billion. Here, too, the result was impressive, with a median annual 10-year TSR of 9.1%. However, the industry average is only partially representative of the companies as a whole. Since its first publication of the "Chemicals Value Creators Report" in 2012, a small group of companies has been at the top of the industry, including Croda from the UK, Pidilite from India, Sherwin-Williams from the USA, and the Swiss company Sika. Just 22 companies worldwide are among the consistent highflyers that have landed in the top quartile of annual TSR performance at least four times in ten years. There is a huge gap between the top performers and other companies; and even within the top group, the differences are considerable. India's PI Industries, for example, achieved a median annual TSR of 47% between 2011 and 2020, while US-based FMC came in at just 14%. Overall, only slightly more than one-third of the surveyed companies were able to increase their value at an above-average rate. All others were far below average or even recorded a negative TSR.

India-based Players Grow most Dynamically Companies from India (10-year annual median 29%) and the US (13%) saw particularly high TSR growth, while Greater China underperformed with 4%. However, the figures may not fully represent the strength of Chinese companies within the industry, as the study excludes privately held and state-owned companies. Overall, however, the study does not provide any concrete evidence that geographic affiliation has a decisive influence on a company's success. India is an exception: chemical companies there have been experiencing an enormous upswing since 2014, boosted both by government investment programs and the steadily growing middle class on the subcontinent. The median annual 10-year TSR in South Asia was 32% — the highest of any region and nearly four times the global TSR of 9%. Five of

the top-performing companies, including TSR leaders PI Industries and Pidilite, are based in India.

Specialty Companies Dominate the Top Group

For further analysis, we group the surveyed companies into five subsectors: agrochemical and fertilizer, base chemicals and basic plastics, focused specialty, industrial gases, and multispecialty. More than half of the top 22 companies belong to the focused-specialty subsector. Looking at all the companies analyzed for the study, this subsector achieved the highest increase in value for shareholders, with a median annual 10-year TSR of 13%. Only the industrial gases subsector can boast a comparably good result. Nevertheless, no industrial gases company is among the top 22 performers. Looking one level below the five subsectors, there are 20 product clusters, of which those belonging to the focused-specialty subsector have the highest TSR. Electronic chemicals players, who supply precursors for the manufacture of silicon wafers and semiconductor production, performed particularly well. Due to increasing digitalization, demand for these chemicals will continue to rise. Other product clusters, such as paints & coatings, are booming in lockstep with the construction industry. Mining & oilfield and agrochemicals in particular have lost significant importance over the past five years. However, belonging to a subsector or to a product cluster alone is no guarantee for sustainable value creation. The question arises as to what the top performers do differently and what value creation strategies they pursue. BCG's analysis has shown that the business model, the ability to innovate, and strategic acquisitions contribute significantly to value creation.

Consistent Alignment with the Market

Many of the top-value creating chemical companies pursue a market-based business model. This means that they consistently align their offerings and set-up to market requirements. They adapt to changes more quickly and adjust their business model more flexibly than their competitors. Of all the companies in this study, those with a market-oriented business model have a median annual TSR of around 14% over ten years. India's Berger Paints is consistently pursuing this business model. The company has adapted its offering to the changing needs of the Indian population. The paint and coatings manufacturer, a supplier to the automotive industry, maintains 40 training centers for painters and has trained more than 60,000 painters in the 2020 pandemic year. The number of retailers selling Berger products has doubled from 15,000 to 30,000 since 2015. Berger has also expanded its product range to include adjacent categories such as glass, wood, and metal coatings as well as construction chemicals. The company is constantly realigning itself to serve India's diverse customer base. Many specialty chemical companies are pursuing technology-based business models. They compete through proprietary technologies and intellectual capital. This group includes suppliers of high-performance polymers, enzymes, and catalysts for industrial processes as well as electronic chemicals for semiconductor manufacturing. Such a business model typically requires a strong IP base and a unique offering — or one that is difficult to imitate. The median annual TSR of this group is 12% over ten years. The ability to successfully innovate is also a hallmark of top performers. Germany's Symrise, a leading manufacturer of flavors and fragrances, generates more than 20% of its sales from new products each year. Its organic growth since 2011 has been consistently higher compared to its competitors. The top performers also pursue mergers and acquisitions strategically. Houston, US-based Westlake Chemical purchased Boral's North American building products business in 2021 to strengthen its position in the fast-growing North American construction market. Westlake is also positioning itself in the environmentally sustainable

plastics market through acquisitions of, among others, Dimex, a leading manufacturer of recycled plastic and related environmentally friendly products. Westlake is now the second-largest producer of PVC in the world.

The Future of the Industry is Green

Even though the chemical industry has coped well with the current crisis, the pressure to adapt will increase in the future. Top companies will not be content with optimizing existing processes and increasing production volumes. They will use more digital technologies and collaborate intensively with their customers and a variety of partners in the ecosystem. More than 50% of the chemicals growth in the near future will happen in China. Companies will shift their focus from upstream and base chemicals to downstream chemicals such as electronic chemicals and food ingredients. Western chemical companies, on the other hand, will have to re-regionalize their supply chains to compensate for the vulnerability of global logistics and geopolitical hurdles, such as the US-China trade dispute or the heavily discussed European Union's carbon border tax. Decarbonization needs, in particular, will pose major new challenges for the industry in the coming years, but it will also open up new opportunities. The successful chemical companies of the future will pursue a net-zero carbon footprint using innovations such as e-crackers, chemical recycling, bio-based feedstocks and fermentation technologies. Overall, chemical products will contribute to sustainable applications: storing energy, isolating human habitats, and reducing materials' weight and carbon emissions. This way, the chemical sector has the potential to become a driving force for economic development in industries such as manufacturing, construction, agriculture, energy, or mobility.

Ramping Up Biomanufacturing Capacity: Capital Investments in Biomanufacturing Continues to Be an Active Area for CDMOs/CMOs

April 20, 2022: Biomanufacturing for both traditional biologics and new modalities, such as cell and gene therapies, continues to be an active area of investment for CDMOs/CMOs. Some of the major investments by the larger CDMOs/CMOs are outlined in this article.

Fujifilm Diosynth Biotechnologies

In October 2021, Fujifilm Diosynth Biotechnologies broke ground on a new, \$ 2-billion, large-scale cell-culture biomanufacturing facility in Holly Springs, North Carolina. The company had announced the investment in January 2021. The facility is expected to be operational by the spring of 2025. The new facility is one of several biomanufacturing investments announced or proceeding by Fujifilm Diosynth. In December 2021, the company announced plans to invest £ 400 million (\$ 533 million) to expand its site in Billingham, Teesside, UK, with the addition of a viral gene-therapy facility and a mammalian cell-culture facility. The new facilities are expected to be operational by late 2023. The investment is part of a 90 billion Yen (\$ 797 million) global capital investment package initially outlined by the company in June 2021. In addition to the gene-therapy and cell-culture manufacturing expansion in the UK, the investment includes doubling cell-culture production for recombinant vaccines in the US and doubling microbial fermentation capacity at an existing UK facility. In addition, the company is investing 100 billion Yen (\$ 928 million) at its site in Hillerød, Denmark, near Copenhagen, to double drug-substance biomanufacturing capacity, expand its capabilities to include fill-finish, and enhance its current assembly, labeling, and packaging services. Fujifilm Diosynth acquired the facility from Biogen in 2019 for approximately \$ 890 million. The investment will expand production lines for bulk drug substances with the addition of

six mammalian-cell bioreactors, which would bring the total capacity to 12 x 20,000-liter bioreactors by the fall of 2023. The company is investing to expand its advanced therapy manufacturing capabilities. Earlier this year (2022), Fujifilm Diosynth announced a \$ 300-million expansion of its single-use manufacturing campus in College Station, Texas, through the addition of a new production facility that will double the company's advanced therapy and vaccine manufacturing capacity in the US. The investment is part of the company's previously announced global capital investment package initially outlined by Fujifilm in June 2021. This new facility, expected to be operational by 2024, will add approximately 138,000 sq. ft. to the existing campus and grow the site to 300,000 sq. ft. Also, earlier this year (2022), Fujifilm agreed to acquire a cell-therapy manufacturing facility in Thousand Oaks, California, from Atara Biotherapeutics, a South San Francisco, California-based biopharmaceutical company, for \$ 100 million. The facility can produce both clinical and commercial cell therapies, including allogeneic T-cell and CAR T immunotherapies. The acquisition is expected to be completed in April 2022. Fujifilm Diosynth is also expanding its viral vector and gene therapy offerings in Darlington, UK, with process development laboratories and manufacturing capabilities for early-stage gene therapies. The process development laboratories are operational with manufacturing services starting in the spring of 2022.

Samsung Biologics

One of the largest expansions announced or ongoing expansions by CDMOs/CMOs is Samsung Biologics' KWR 2-trillion (\$ 1.7-billion) investment for a new biomanufacturing plant, the company's fourth, in Incheon, South Korea, and for a second bio complex. The company broke ground on the new facility in November 2020, which, upon completion, will provide 256,000 liters in total biomanufacturing capacity. The plant will have a modular design that will allow flexibility for certain parts of the plant to begin manufacturing activities by the end of 2022, with the goal to commence full operations in 2023. In January 2022, Samsung Biologics, announced plans to start construction of a new manufacturing facility for multi-modal products, including cell and gene therapies and vaccines using mRNA, pDNA, and viral vectors, all at a single site. This facility will be in addition to the mRNA vaccine drug-substance manufacturing suite the company is adding to its existing facility in Songdo, South Korea. The company says it is also venturing into securing additional sites within Songdo for the construction of a sixth manufacturing facility and innovation center, and also overseas in multiple locations to maximize its manufacturing capacity to produce large-scale biologics.

Lonza

Lonza is proceeding with expansions in the US, Europe, and Asia. In 2021, Lonza announced plans to invest approximately CHF 850 million (\$ 935 million) to add two mammalian drug-substance manufacturing facilities at its sites in Visp, Switzerland, and Portsmouth, New Hampshire. The expansion in Visp will add a new 27,500-m² large-scale mammalian drug-substance manufacturing facility. The facility is expected to be completed in 2024 with an investment of approximately CHF 650 million (\$ 715 million). In Portsmouth, New Hampshire, the company is adding a new biomanufacturing facility for small-to-mid-volume production. The CHF 200-million (\$ 220-million) facility will add capacity for up to eight 2,000-L single-use bioreactors to support Phase III clinical and commercial small- to mid-volume products. The facility is expected to be completed in 2023. In addition, Lonza began operations in 2021 at its new 17,000 m² mammalian-cell biomanufacturing facility in Guangzhou, China. Lonza is continuing to support

its collaboration with Moderna for mRNA vaccine manufacture with a new mRNA line in Geleen, the Netherlands, as well as three new mRNA lines in Visp, making a total of eight mRNA commercial-scale lines the company has across Europe. In addition, in November 2021, Lonza announced an investment to expand microbial development capacity at its facility in Visp, and in October 2021 announced plans to expand its biologics development services at its site in Tuas, Singapore.

Boehringer Ingelheim

In October (October 2021), Boehringer Ingelheim (BI) inaugurated a new € 700-million (\$ 780 million) large-scale, cell-culture biomanufacturing facility in Vienna, Austria. The facility has up to 150,000-liter manufacturing capacity for BI products and contract manufacturing activities. The company broke ground on the facility in 2017, and the facility adds to the company's biomanufacturing network in Biberach, Germany; Vienna, Austria; Fremont, California; and Shanghai, China.

Thermo Fisher Scientific

Thermo Fisher made several moves to expand both cell- and gene-therapy manufacturing and traditional biomanufacturing. In 2021, the company added to its contract viral vector manufacturing services with the acquisition of Henogen, Novasep's viral vector manufacturing business, for approximately \$ 875 million. Also in 2021, Thermo Fisher Scientific opened a new pDNA manufacturing facility in Carlsbad, California. Additionally, this year (2022), the company will launch mRNA synthesis capabilities at its site in Monza, Italy, to produce drug substance for vaccines and therapies. The company is also moving forward with its partnership with the University of California, San Francisco (UCSF) for development and manufacturing of cell-based therapies. A new 44,000-sq-ft. cell-therapy development and cGMP manufacturing center at UCSF's Mission Bay campus is slated to open later this year (2022). These expansions build on the company's continued investment in cell- and gene-therapy manufacturing facilities, including: (1) viral vector facilities in Cambridge, Lexington, and Plainville, Massachusetts, and Alachua, Florida; (2) a new cell-therapy manufacturing facility in Princeton, New Jersey; and, (3) a new dedicated cryocenter in Weil am Rhein, Germany, to provide specialized cryogenic and cold-chain supply-chain services to support clinical trials across Europe and globally. The new commercial manufacturing site in Plainville, Massachusetts for viral vector capacity for gene therapies and vaccines is slated to be completed later this year (2022). Also, later this year (2022), Thermo Fisher will begin operations at a new biologics manufacturing site in Lengnau, Switzerland. The company had earlier formed a strategic partnership with CSL Limited, a Melbourne, Australia-based biopharmaceutical company, to operate the site, for both CSL and other customer projects. Thermo Fisher is also expanding operations at its biologic drug-substance manufacturing facility in St. Louis, Missouri, and is expanding in Asia-Pacific with an integrated biologics drug-substance and sterile drug-product manufacturing facility in Hangzhou, China.

Catalent

Catalent is investing to increase biologics drug-substance manufacturing and cell- and gene-therapy manufacturing. In July 2021, Catalent announced that it will begin the first phase of a planned \$ 100-million expansion at its facility in Anagni, Italy, to add biologics drug-substance manufacturing. The initial expansion is expected to be commissioned and operational for customer projects in April 2023. Catalent's Anagni site now provides aseptic filling, secondary packaging, and oral dose manufacturing for late-stage and commercial product launches. Since Catalent acquired the facility in January 2020,

it has become a European hub for Covid-19 vaccine manufacturing as well. Also, on the biologics drug-substance side, in 2021, Catalent completed the expansion of two new suites at its biologics drug-substance development and manufacturing facility in Madison, Wisconsin. The expansion increased the number of manufacturing suites at the site to five, which more than doubled its overall cGMP-scale capacity. In cell and gene therapies, in 2021, Catalent acquired RheinCell Therapeutics, a Langenfeld, Germany-based developer and manufacturer of human induced pluripotent stem cells, which became part of Catalent's Cell & Gene Therapy business. In May 2021, Catalent acquired Promethera Biosciences' cell-therapy manufacturing subsidiary, Hepatic Cell Therapy Support SA (HCTS), including its 32,400-square-foot facility in Gosselies, Belgium. The facility will accommodate Catalent's commercial-scale pDNA manufacturing and is located on Catalent's existing campus in Gosselies, adjacent to the Delphi Genetics building. Catalent announced the acquisition of Delphi Genetics in 2021, a spinoff from the Université libre de Bruxelles and a bioproduction CDMO with capabilities in pDNA development and cGMP manufacturing. Catalent gained its facilities in Gosselies, Belgium, with its \$ 315-million acquisition of MaSTherCell, a provider of cell- and gene-therapy development and manufacturing services in 2020. In addition, in October 2021, Catalent announced a \$ 230-million expansion project to add three commercial-scale viral-vector manufacturing suites and associated support facilities and services at its gene-therapy campus in Harmans, Maryland, which brings its total investment at the site to \$ 360 million. A second facility is under construction following an initial \$ 130-million to add five new manufacturing suites. When completed at the end of 2022, the campus will house a total of 18 viral-vector manufacturing suites.

WuXi Biologics

Last November (November 2021), WuXi Biologics completed the first GMP production of a new 24,000-L line of its drug-substance facility (MFG) in WuXi, China. This followed the initial GMP operations of the 36,000-L biomanufacturing line at the facility earlier in 2021. The facility has a total of 60,000 L of biomanufacturing capacity to support late-phase and commercial projects across multiple modalities, such as monoclonal antibodies, bispecifics, and fusion proteins, providing the company with total biomanufacturing capacity of approximately 150,000 L. Also, in 2021, the company completed three acquisitions to increase its production capacity: a drug-substance facility in Wuppertal, Germany, from Bayer; drug-substance/drug-product facilities in Hangzhou, China, from Pfizer; and the Chinese CDMO CMAB Biopharma.

Clariant and Technip Energies in Sunliquid Alliance

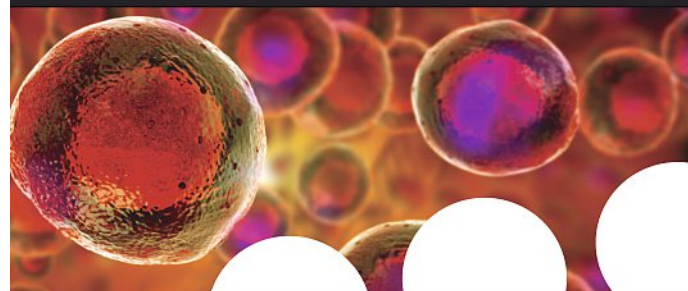
April 21, 2022: Swiss chemicals company Clariant has entered into a cooperation agreement for its Sunliquid cellulosic ethanol technology with Technip Energies. The technology converts agricultural residues, woody materials or municipal solid wastes into cellulosic sugars, which are then fermented into cellulosic ethanol. Clariant said Sunliquid customers will benefit from the combination of its proven technology with Technip Energies' deep experience as an engineering, procurement and construction contractor in building advanced biofuel plants. "The cooperation with Technip Energies will enhance the service offerings we provide to our customers and thus will accelerate the Sunliquid footprint with the ultimate aim of transitioning to an emission-free mobility," said Christian Librera, vice president & head of Clariant's biofuels & derivatives business line. Ethanol produced by the Sunliquid process can be used as a drop-in product for fuel blending and offers further opportunities downstream into sustainable aviation fuels and bio-based

chemicals, Clariant said. It can also be further processed into green ethylene and ethylene derivatives, and other sugar-derived chemicals using other proprietary technologies offered by Technip Energies. At the end of last year, Clariant completed construction of its first full-scale commercial Sunliquid plant in Podari, Romania. The plant, which processes about 250,000 t/y of straw to produce 50,000 t/y of cellulosic ethanol, has started up and will be fully operational sometime during 2022. In separate news, Clariant has completed the sale of its 50% stake in Scientific Design to joint venture partner SABIC. Scientific Design licenses high-performance process technologies and manufactures catalysts. The transaction was originally announced on Feb. 2 and Clariant's share was valued at \$130 million. The Basel-based group said it will use the proceeds to invest in growth projects within its core business areas, execute its strategy along sustainability and innovation, fund performance improvement programs and strengthen its balance sheet to reach and defend a solid investment grade rating. For SABIC, the acquisition will deepen its growth in the specialties market and help it meet increasing demand for catalysts. Last year, the Saudi giant repositioned its specialties division as a stand-alone strategic business unit in order to unlock organic and inorganic growth opportunities independent of feedstock dynamics.

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