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Community News

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SWISS CHEMICAL SOCIETY NEWS

Review and Photos of the SCS Fall Meeting 2018



With close to 1000 participants, more than 100 lectures and short talks, 400 poster presentations and 16 exhibitors, the SCS Fall Meeting took place at EPFL Lausanne on September 7, 2018. It not only was a fantastic opportunity to meet colleagues from the community and to exchange ideas but also to pick up new approaches from other research

fields and to broaden one's horizon.

Prof. Sandrine Gerber and her team from EPFL organized the two plenary sessions as well as the eight parallel sessions and its related poster sessions in a perfect manner and we like to take the opportunity to express our thank to the EPFL staff for their fantastic support.

On the symposium website of the Fall Meeting as well as on the SCS website you can find several galleries with pictures from the event.

Save the dates for 2019 and 2020:

The next Fall Meetings will take place at University of Zurich on September 6, 2019 and at University of Bern on August 24–25, 2020.

Successful Exhibitor Challenge at the SCS Fall Meeting 2018

For the first time, the organizers included the exhibitors actively in the program of the SCS Fall Meeting and launched the SCS Exhibitor Challenge. The goal for the participants was to collect as many exhibitor stickers as possible and fill their sticker card. Cards with a complete column or row participated in the lottery of 2x CHF 50.- in cash and all full cards were taken in account for the main prize of CHF 100.- in cash.

The campaign catalyzed the interaction between the booth staff of the exhibitors and the participants and led to many fruitful discussions. The exhibitor, the participants and the organizers were surprised about the dynamic of the challenge and after the successful launch the organizers will, for sure, continue the initiative.

Winners:

- 1x 100.-
Irina Diukova, EPFL Lausanne
- 2x 50.-
Bansal Priyanka, EPFL Lausanne and
Mohebodin Karbasiyoun, University of Zurich

Thanks to all Exhibitors that supported the SCS Fall Meeting and the Exhibitor Challenge.

scg.ch/news
scg.ch/fallmeeting/2018

Prof. Olivier Nicolet, HES-SO, elected as new President of the SCS Photochemistry Section



At the General Assembly of the Photochemistry Section of the SCS at EPFL Lausanne on September 7, 2018, Prof. Olivier Nicolet, University of Applied Sciences and Arts, Western Switzerland (HES-SO) was elected as new president. He succeeds Silvio Canonica who served as president for eight years and who will stay in the board as member for another

term to ensure continuity.

We like to welcome Olivier Nicolet as new president and thank Silvio Canonica for leading the section for so many years.

Members of the Photochemistry Board 2018-2020:

- Olivier Nicolet, HES-SO Fribourg – President
- Silvio Canonica, Eawag Dübendorf – Member (Past-President)
- Kurt Dietliker, ETH Zürich – Member
- Tatu Kumpulainen, University of Geneva – Member (new)
- Oliver Wenger, University of Basel – Member

<https://scg.ch/pcs>

Open Positions in the SYCA Board



The Swiss Young Chemists' Association (SYCA) is a section of the Swiss Chemical Society that unifies all SCS members up to the age of 36 years. In the past months, many of the SYCA board members stepped down due to their seniority and we are now looking for new, young and engaged community members that are willing to complete

the SYCA board.

We like to implement new structures, communication channels and activities in the upcoming months. For all young SCS members it's a chance to actively help shaping the young generation's future!

Our goal is to complete the SYCA board with one representative per University, Federal Institute of Technology and University of Applied Sciences. Our new strategy is based on delegates from all over Switzerland.

Take the opportunity and connect to a fantastic network. Your tasks would be:

- Participate in 1-2 board meetings per year
- Communicate SYCA initiatives within your University/Department to your colleagues and motivate them to participate in our activities (ambassadors on-site are much more effective than mails and tweets)
- If ever possible, participate in the Swiss Snow Symposium in Saas-Fee, the flagship event of the SYCA
- Participate occasionally in organizing committees for SYCA activities (company visits, expert talks, satellite events of SCS meetings, ...)

- Discuss the young generation's expectations with the SCS Executive Board members and representatives from industry
- If interested, participate in international activities that are jointly organized with the EuChemS European Young Chemists' Network.

If you are interested in a first meeting without further obligation (just to get a feeling of what's about) or if you have any questions please contact Dmitry on dmitry.vasilyev@epfl.ch.

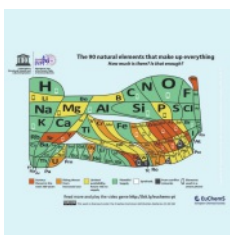
We are looking forward to hearing from you!

Dmitry Vasilyev, President (EPFL)

Cornel Fink, Past-President (EPFL)

Lu Chen, Treasurer (EPFL)

Element Scarcity – EuChemS Periodic Table



The smartphone you may be using right now to look at this unique Periodic Table is made up of some 30 elements – over half of which may give cause for concern in the years to come because of increasing scarcity. The issue of element scarcity cannot be stressed enough. With some 10 million smartphones being discarded or replaced every month in the European

Union alone, we need to carefully look at our tendencies to waste and improperly recycle such items. Unless solutions are provided, we risk seeing many of the natural elements that make up the world around us run out – whether because of limited supplies, their location in conflict areas, or our incapacity to fully recycle them.

Protecting endangered elements needs to be achieved on a number of levels. As individuals, we need to question whether upgrades to our phones and other electronic devices are truly necessary, and we need to make sure that we recycle correctly to avoid old electronics don't end up in landfill sites or polluting the environment. On a political level, we need to see a greater recognition of the risk element scarcity poses, and moves need to be made to support better recycling practices and an efficient circular economy. Moreover, transparency and ethical issues need to be considered to avoid the abuse of human rights, as well as to allow citizens to make informed choices when purchasing smartphones or other electronics – as many of the elements we require in our electronics are imported from conflict zones.

2019 has been pronounced the International Year of the Periodic Table (IYPT2019), and EuChemS, the European Chemical Society, hopes that this unique and thought-provoking Periodic Table will lead to reflection and ultimately, action. Over the next year, they will provide featured articles on specific elements, their endangered status, and the consequences this will have on the world around us.

The Periodic Table is available for free download. Please note that the work is licensed under the Creative Commons Attribution NoDerivs CC BY-ND.

Support notes, which explain in more detail how the Periodic Table has been designed, and which also include some questions for students, will soon be available for download on the EuChemS website.

Spread the word and help protect endangered elements! Share on Twitter, Facebook and LinkedIn and follow the conversation through #elementscarcity & #IYPT2019.

<https://www.euchems.eu/iypt2019/>

A Warm Welcome to Our New Members!



Period: 24.08. – 24.09.2018

Alessandra Antonucci, Chavannes-près-Renens - Sidonie Aubert, London - Karla Banjac, Morges - Maartje Bastings, Lausanne - Enzo Bomal, Lausanne - Christoph Bostedt, Ennetbaden - Christopher Brenig, Zürich - Graham Dick, Lausanne - Scott Docherty, Zürich - Luc Driencourt, Village Neuf -

Nicolas Duchemin, London - George Fish, Lausanne - Adnan Ganic, Möhlin - Michael Giffin, Morges - Alice Gillen, St. Sulpice - Amin Hodaei, Lausanne - Valdrin Islami, Zürich - Sëtuhn Jimaja, Birmingham - Matthias Krack, Ehrendingen - Andreas Markus Küffner, Zürich - Severin Martz, Bern - Marc Mas Münster, Allschwil - Jan Matter, Udligenswil - Aliko Moysiadou, Lausanne - Peter Nesvadba, Marly - Oguzhan Oguz, Lausanne - Michael Parmentier, Basel - Andrea Pasti, Zürich - Felix Pultar, Zürich - Jonas Rackl, Dietfurt - Seryio Saris, Sion - Tatsuya Shinagawa, Zurich - Eric Sidler, Basel - Lucille Simond, Genève - Etienne Socie, Lausanne - Gabriele Tocci, Zürich - Hanna Traeger, Granges-Paccot - Shang-Jung Wu, Morges - Reuben Yeo, St-Sulpice, VD - Damin Zhang, Brugg - Fabienne Ziereisen, Steinen - Vitaljs Zubkovs, Renens.

HONORS, AWARDS, APPOINTMENTS

SCS Prize Ceremonies on the Occasion of the SCS Fall Meeting 2018

On the eve of the SCS Fall Meeting 2018 in Lausanne, the Swiss Chemical Society celebrated the prize winners 2018 and honored three individuals and one team for their outstanding scientific contributions.

All winners contributed an invited lecture to one of the plenary sessions of the SCS Fall Meeting and gave an insight into their research activities of the past years.

We like to take to opportunity to congratulate all winners again for their exciting achievements and we are looking forward to their CHIMIA articles next year that will be published in issue 7-8/2019.

The Swiss Chemical Society awarded



Prof. Ruedi Aebersold, ETH Zurich, the Paracelsus Award 2018 for his exceptional and visionary contributions to the field of proteomics in general and to the fields of analytical chemistry, protein chemistry, and mass spectrometry specifically.



Dr. Paul W. Manley, Novartis Pharmaceuticals AG, Basel, the SCS Distinguished Investigator Award 2018

for his impressive track record of success as a medicinal chemist, including 31 years in Basel at Sandoz/Novartis, working in several disease areas and on multiple classes of drug targets, including the invention of the commercial antileukemia drug Nilotinib.



Dr. Clemens Lamberth, Syngenta Crop Protection AG, Stein, the SISF-SCS Senior Investigator Award 2018

for his impressive track record of success in the field of fungicide research within Crop Protection, including the invention of the fungicide Mandipropamid (Revus®, Pergado®).



The Sandmeyer Award 2018 goes to the team from Syngenta Crop Protection AG, Stein (AG), namely

Dr. Raymonde Fonné-Pfister,
Dr. Claudio Screpanti,
Dr. Alain De Mesmaeker and
Dr. Harro Bouwmeester, University of Amsterdam,

for their pioneering work on Strigolactones that can be considered a collaboration masterpiece between Industry and Academia to explore novel area of this phytohormonal family.

for their pioneering work on Strigolactones that can be considered a collaboration masterpiece between Industry and Academia to explore novel area of this phytohormonal family.

Winners of the Best Presentation Awards at the SCS Fall Meeting 2018



In collaboration with Metrohm and DSM Nutritional Products, SCS offered again the very attractive and prestigious Fall Meeting Best Presentation Award program. It's probably the most highly remunerated award program of this kind in the field and we are very proud and happy to cooperate with our sponsoring partners. We wish to express our sincere

gratitude to Metrohm and DSM for their generous support and congratulate all winners for their fantastic contributions. Bruno Winterhalter, representative of Metrohm Foundation and Thomas Netscher from DSM, awarded a total of 37 winners at the end of the SCS Fall Meeting at EPFL Lausanne on September 7, 2018.

Winners of the Best Oral Presentation Awards 2018

Analytical Sciences

Winner: Kristýna Kantnerová, Empa/ETH Zürich

Runner up: Nora Nowak, ETH Zürich

Catalysis Science & Engineering

Winner: Lucas Foppa, ETH Zürich

Runner up: Rajiv Prabhakar, University of Zürich

Computational Chemistry (@STC in Basel)

Winner: Ganna Gryn'ova, EPFL Lausanne

Runner up: Oliver Unke, University of Basel

Inorganic & Coordination Chemistry

Winner: Christopher Gordon, ETH Zürich

Runner up: Sabine Malzkuhn, University of Basel

Medicinal Chemistry & Chemical Biology

Winner: Fabio Steffen, University of Zürich

Organic Chemistry

Winner: Daria Grosheva, EPFL Lausanne

Runner up: Alessandro Castrogiovanni, University Basel

Physical Chemistry

Winner: Irina Ritsch, ETH Zürich

Runner up: Vít Svoboda, ETH Zürich

Polymers, Colloids & Interfaces

Winner: Laura Neumann, AMI, Fribourg

Runner up: Ahmet Demiroers, ETH Zürich



Winners of the Best Poster Presentation Awards 2018

Analytical Sciences

Winner: Shang-Jung Wu, EPFL Lausanne

Runner up: Charlotte Driesen, Empa

Catalysis Science & Engineering

Winner: Guido Zichittella, ETH Zürich

Runners up: Christophe Baranowski, EPFL Lausanne

Maria Bouri, University of Bern

Computational Chemistry

Winner: Tiziana Musso, University of Zürich

Runner up: Federico Paruzzo, EPFL Lausanne

Inorganic & Coordination Chemistry

Winner: Philipp Melle, University of Bern

Runners up: Viktoriia Morad, ETH Zürich

Lucius Schmid, University of Basel

Medicinal Chemistry

Winner: Rémi Martinet, University of Geneva

Runner up: François Halloy, ETH Zürich

Chemical Biology

Winner: Rebecca Schäfer, ETH Zürich

Runner up: Micael Cunha, University of Bern

Organic Chemistry

Winner: Daniel Čavlović, University of Zürich

Runners up: Marion Garreau, EPFL Lausanne

Philipp Seeberger, EPFL Lausanne

Physical Chemistry

Winner: Jovana Milic, EPFL Lausanne

Runners up: Luca Semeria, ETH Zürich

Maksim Eremchev, EPFL Lausanne

Polymers, Colloids & Interfaces

Winner: Chengjun Kang, ZHAW Wädenswil

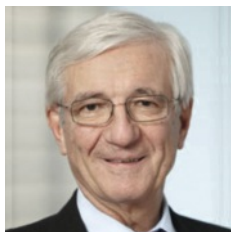
Runners up: Yinyin Bao, ETH Zürich

Diana Hohl, University of Fribourg



scg.ch/fallmeeting/2018

Prof. Dieter Seebach, ETHZ, receives the Arthur C. Cope Award 2019



On April 2, 2019, the American Chemical Society will honor **Prof. Dieter Seebach** with the Arthur C. Cope Award. This is one of the most prestigious awards.

The Arthur C. Cope Award recognizes outstanding achievement in the field of organic chemistry, the significance of which has become apparent within the

five years preceding the year in which the award will be considered.

Source: www.chab.ethz.ch

Prof. Xile Hu, EPFL Lausanne, wins Caltech Resonate Award



EPFL Lausanne Chemistry **Prof. Xile Hu** has won the 2018 Resonate Award from Caltech for his work on developing abundant and non-precious metal catalysts for sustainable synthesis of added-value chemicals and cost-effective production of solar fuels. Prof. Hu has distinguished himself by his pioneering research on the production of

solar fuels, as well as on the synthesis of molecules with high added value.

The Resonate Awards are given each year by Caltech's Resnick Sustainability Institute to "honor outstanding achievement in renewable energy and sustainability-focused science and technology."

The Awards are given to "up-and-coming" innovating scientists under the age of 40, and whose work "charts new pathways or opens up new areas to solutions with long-term impacts on sustainability challenges such as energy security, climate change and the environment."

Source: <https://actu.epfl.ch/>

Kumar Varoon Agrawal, EPFL Lausanne, wins 2018 ERC Starting Grant



Prof. Kumar Varoon Agrawal (School of Basic Sciences, Institute of Chemical Sciences and Engineering) has received a Starting Grant for his project: "UltimateMembranes: Energy-efficient membranes for carbon capture by crystal engineering of two-dimensional nanoporous materials". The project will develop CO₂-selective membranes that are only

a few nanometer thick, cutting down the energy penalty for CO₂ capture from the industrial streams.

"We are extremely excited about the development of these high-performance two-dimensional membranes, which can be a game-changer," says Agrawal.

The ERC Starting Grants are given each year to researchers of any nationality and in any field of research with 2-7 years of research experience after the completion of their PhD and who show a promising scientific track record, and offer an excellent research proposal. The application must be made from an EU or associated country, and each Starting Grant can be up to €1.5 million given over a period of five years.

Source: <https://actu.epfl.ch/>

Prof. Pérez-Ramírez, ETHZ, receives the 2017 Sustainable Energy Award



On September 5, **Prof. Pérez-Ramírez** received the 2017 Sustainable Energy Award from the Royal Society of Chemistry at the event "Mitigating issues of future wastes: enhancing resource productivity in emerging technologies".

Source: twitter.com/RoySocChem

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JOURNAL NEWS

Chemistry – A European Journal: Young Chemists Special Issue



Guest-edited by Bruno Pignataro, this second edition of the Young Chemists Special Issue has been assembled to honor not only the participants of the European Young Chemist Award (EY-CA), presented at the 2014 and 2016 Eu-CheMS Congresses, but also young and emerging scientists from all different fields of chemistry around the world.

More information:

<https://onlinelibrary.wiley.com/toc/15213765/2018/24/47>

EurJIC and EurJOC: Highlighting the ICIQ in Our New Series: European Institute Feature



EurJIC and EurJOC are introducing European Institute Features! As the first top European institute in this series, the journals are highlighting the Institute of Chemical Research of Catalonia (ICIQ) in Tarragona, Spain, in a joint virtual issue. This issue brings you a collection of high-quality articles, representative of the excellent research performed at

the institute. It is rounded by a Guest Editorial written by the director of the institute, Miquel A. Pericàs, who gives a brief history of the ICIQ and its development over the years.

Discover more on:

[https://onlinelibrary.wiley.com/doi/toc/10.1002/\(ISSN\)1099-0682c.InstituteFeatureICIQEJIC](https://onlinelibrary.wiley.com/doi/toc/10.1002/(ISSN)1099-0682c.InstituteFeatureICIQEJIC)

European Journal of Organic Chemistry: Special Issue on Organofluorine Chemistry in Europe



As part of the ongoing 20th anniversary celebrations, EurJOC is highlighting outstanding work by European researchers. This Special Issue is dedicated to Organofluorine Chemistry in Europe and showcases the state of the art in this field. With contributions from: Gianluca Maria Farinola, Graham Pattison, Thierry Billard, and Ryan Gilmour and many

more. Enjoy free access until the end of 2018!

More information:

<https://onlinelibrary.wiley.com/toc/10990690/2018/2018/27-28>

INDUSTRIAL NEWS

Source: www.chemanager-online.com

Affimed and Genentech in Immunotherapy Pact

September 4, 2018: German biopharma Affimed has agreed a strategic collaboration with Genentech, part of Swiss drug giant Roche, to develop immunotherapies for multiple cancers. Affimed will apply its proprietary Redirected Optimised Cell

Killing (ROCK) platform, which enables the generation of both NK cell and T cell-engaging antibodies, to discover and advance innate immune cell engager-based immunotherapies that are of interest to Genentech. The collaboration includes candidate products generated from Affimed's ROCK platform and multiple undisclosed solid and hematologic tumor targets. The partners will collaborate on the discovery, early research and late-stage research phases, while Genentech will be responsible for clinical development and global commercialization. "Our partnership with Affimed provides an opportunity to enhance our existing efforts to understand how the immune system can be activated to help people living with cancer," said James Sabry, Roche's global head of partnering. Under the agreed terms, Affimed will receive \$96 million in an initial upfront payment and other near-term committed funding. It could also be eligible to receive up to an additional \$5 billion over time, including payments upon meeting specified development, regulatory and commercial milestones, plus sales royalties. The agreement, which remains subject to antitrust approval, is expected to close in the third quarter.

ChemChina said to mull Asset Sales

September 7, 2018: ChemChina is studying potential asset sales as it prepares a mega merger with Sinochem Group, the news agency Bloomberg has reported, citing "people with knowledge of the matter." Chinese authorities are said to have granted preliminary approval for the fusion, confirming rumors circulating for nearly two years. According to the sources, ChemChina's chairman, Frank Ning, who also leads Sinochem, has started reviewing the chemicals and energy groups' portfolios to identify areas of overlap and potential synergies, thereby considering outright divestitures as well as initial public offerings for some units. Potential flotations could include a minority stake in Swiss agrochemicals producer Syngenta, acquired by ChemChina last year for \$43 billion. From the outset, the Chinese company said it might float part of Syngenta is to reduce the large volume of debt it took on in the largest purchase in Chinese history. The Chinese chemical producer reportedly has already received pitches from investment banks about pursuing an ipo for Syngenta. A merger of ChemChina and Sinochem to create an oil-to-chemicals giant with more than \$100 billion of assets would change the landscape of the Chinese chemicals industry, the news agency notes, adding to a wave of consolidations that President Xi Jinping's administration has pursued to shake up bloated state enterprises. Alongside Syngenta, since its first overseas purchase, French animal nutrition specialist Adisseo Group, ten years ago ChemChina has acquired Adama Agricultural Solutions, an Israeli producer of crop protection products, as well as German machinery maker KraussMaffei, Italian tire manufacturer Pirelli and Norwegian silicon manufacturer Elkem, as well as a stake in Swiss commodity trader Mercuria Energy Group. Some of the acquired companies have been listed or partly listed. This includes Pirelli, which fetched \$2.6 billion in an ipo last year, and Elkem, in March of this year. Sinochem's assets in chemicals include Sinochem International Corp., a chemical trader with a market value of \$2.1 billion in Shanghai, and phosphate producer Sinofert.

Novartis Sells Sandoz US Assets to Aurobindo

September 10, 2018: Novartis has agreed to sell parts of its Sandoz US portfolio to Aurobindo Pharma USA as the Swiss drugmaker drives ahead with its strategy to focus on higher value medicines. Aurobindo will pay \$900 million in cash plus another \$100 million in potential earn-outs for the Sandoz US dermatology business and generic US oral solids portfolio. Aurobindo Pharma's managing director, Narayanan Govindarajan, said the deal will position his company as the second largest dermatology player and the second largest generics company in the US by prescriptions. The sale includes approximately 300 products

as well as additional development projects and manufacturing facilities in Wilson, North Carolina, and Hicksville and Melville, New York. The business had net sales of \$600 million in the first half of 2018. As part of the agreement, roughly 750 employees in Hicksville, Melville, Wilson and Princeton, New Jersey, as well as the field representatives for the PharmaDerm dermatology business, are expected to transfer to Aurobindo. The transaction is expected to close during 2019. “Sharpening our portfolio focus in the US allows us to devote more time and resources toward our strategy of bringing complex generics, value-added medicines and biosimilars to patients in the US, creating higher value and opening up access to important medicines where alternatives are truly needed,” said Richard Francis, Sandoz CEO and member of the Novartis executive committee. “Through this transaction, we are refocusing our business but also striving to ensure continuity of supply of important long-used generic medicines for patients and customers in the US,” Francis added. Since Vas Narasimhan took over as CEO of Novartis on Feb. 1 2018, he has sold a 36.5% stake in a consumer joint venture with GlaxoSmithKline and announced plans to spin off its Alcon eyecare unit.

Sabic closes Clariant Share Purchase

September 11, 2018: With the closing of its purchase of nearly 25% of Swiss speciality chemicals producer Clariant following all approvals, Saudi Arabian chemicals giant SABIC has become the company’s largest shareholder, behind former shareholders of Süd-Chemie, which was acquired by Clariant for \$2.3 billion in 2011. Prior to share purchases by US hedge funds White Tale and 40 North, Süd-Chemie shareholders – many of them members of a single German industrial family – owned the largest chunk of Clariant with around 15%. SABIC’S acquisition plans were announced in January this year, as the funds threw in the towel amid acrid discussions with Clariant’s management after torpedoing the Swiss company’s plans to merge with US rival Huntsman. Completion of the 24.99% share deal was delayed slightly, due to sluggish regulatory clearance in some markets, notably Brazil and Mexico. Financial terms of the transaction have not been revealed. However, analysts said the SABIC buy was easily its biggest since the takeover of engineering plastics producer GE Plastics for \$11.6 billion in 2007. Following the closing, CEO Hariolf Kottmann said, Clariant “looks forward to further developing the strategic relationship between both companies in order to generate value for all stakeholders. Any outcome of these discussions will be presented in due course,” he added. Analysts have speculated that SABIC could be interested in buying more of Clariant at some point, though Kottmann said earlier this was “premature.” While the Saudi group itself stressed that it had “no plans” for a full takeover, some observers noted that with state-owned petchems group Saudi Aramco’s stock flotation off the table for the present, much appears to be in flux in the Kingdom. Aramco is in the process of acquiring the Saudi government’s 70% stake in SABIC. In May, the company clinched a deal to acquire German chemical producer Lanxess’ half of Dutch-based synthetic rubber producer Arlanxeo.

Takeda to Move US Headquarters to Boston

September 14, 2018: Following the completion of its \$64 billion takeover of Shire, Japanese drugmaker Takeda has announced plans to restructure its US operations. In a first move, it will close its Chicago-area headquarters at Deerfield, Illinois, and concentrate the activities close to Boston, near the former headquarters of Ariad, a biotech it acquired for \$5.2 billion in 2017. About 1,000 employees will be affected by the move. Some will receive relocation offers, Takeda told US trade journal Fierce Pharma. The plans, which the company said would better position its pipeline and simplify its US operations, are subject to regulatory and shareholder approvals. Shire also has a base in

the Boston area, where it employs 3,000 people. Takeda employs more than 5,000 people in the US. Last year, Takeda moved as many as 750 employees in R&D and vaccines from the Deerfield site to Cambridge, Massachusetts, while saying it had no plans to close the site altogether. Shire’s rare-disease research and US commercial operations are based in Cambridge, while biologic and other manufacturing operations are in Lexington. Plans for the merged Takeda-Shire foresee a corporate headquarters in Japan. Takeda shareholders would own about 50% of the company, which would have a combined workforce of about 52,000 worldwide. Analysts predict merger-related job cuts totaling 6-7% of the workforce. Additionally, Takeda is said to be considering consolidating Shire’s operations into its own business in the US, Switzerland and Singapore. Shire is officially headquartered in Dublin, but managed from the US. Meanwhile, a small group of Takeda shareholders – led by Kazu Takeda, a descendant of the founding family – continues to try to torpedo the deal. “Hasty decisions on big deals should be avoided. It will lead to disaster if there are large-scale mergers and acquisitions without careful consideration,” Kazu Takeda told London newspaper The Times. Part of the opposition to the deal, Takeda said, is that it would undermine one of the primary principles of “Takeda-ism,” which is that the company make money by making people happy. While saying that scaling up is necessary, he added that management “has to think about the traditional corporate culture and the health of the company.”

SABIC and Clariant to Create Performance Platform

September 19, 2018: Outlining further plans for cooperation between SABIC and Clariant after the Saudi petchems giant completes its acquisition of a nearly 25% stake in the Swiss specialty chemicals producer, the two companies have signed a Memorandum of Understanding (MoU) to create a new stand-alone High Performance Materials business within Clariant. The process of creating this “exceptional global platform for organic and inorganic growth” is anticipated to be completed before the end of 2019 and close at the beginning of 2020, subject to regulatory approvals. It foresees the merger of SABIC’s Specialties business – including the Ultem (polyetherimide, PEI) and Noryl (polyphenylene ether, PPE) resins acquired in the 2007 takeover of GE Plastics and its families of LNP compounds and copolymers – with Clariant’s additives and high-end masterbatch portfolio. In a statement, the companies said the move would make Clariant a “uniquely positioned and competitively advantaged provider of customer-specific high-performance materials and solutions in the specialty chemicals industry, headquartered in Switzerland and listed on the SIX Swiss Exchange”. SABIC stressed again that it “currently has no plans to launch or otherwise effect a full takeover” of the Swiss player. Yousef Al-Benyani, vice chairman and CEO of SABIC, said the two existing Specialties platforms are complementary. SABIC’s investment in Clariant and the intended combination of portions of the respective specialty businesses are “well aligned with the strategy to open new growth opportunities in specialty chemicals,” he commented. Uncoupling the Specialties business will allow the Performance unit to achieve accelerated organic and inorganic growth as aligned with SABIC’s broader corporate strategy of creating a sizeable, world class Specialties company,” Al-Benyani added, remarking that the two sides “will seek to further develop this strategic relationship at the highest levels of both companies.”

Supply Security of Non-cGMP Materials The Changing API and Early Intermediate Supply Chain Landscape

September 19, 2018: The topic of supply chain security is not a new one for the pharmaceutical industry, and much of that discussion has been dominated by the cGMP portion of the API supply

chain. The discussion regularly addresses reduction of risk, superior quality systems, dependable supply, innovation and competitiveness. These elements are often referred to as the “Value Chain.” Recently, however, the conversation has begun to expand beyond the cGMP portion of the supply chain to a wider focus including the early supply chain, specifically for the supply of non-cGMP materials for API production. Due to changes in conditions related to the supply of these materials from typical sources, supply chain experts are now in need and in search of non-cGMP materials that once again secure the supply of their APIs by embracing Value Chain principles – including from suppliers based in the West, a departure from historical trends. In the late 1990’s, global chemical capacity expanded dramatically, causing a substantial excess. The expansion mostly took place in India and China, and the raw materials and non-cGMP intermediate production shifted towards the East as a result, with Western producers largely focusing on downstream cGMP manufacturing.^[1] During this same outsource expansion period, quality systems evolved considerably with more oversight needed for the entire supply chain, not just the regulated components. Supplier audits of quality systems were beginning for the non-cGMP suppliers as well, recognizing quality gaps as an issue.^[2] Risk mitigation strategies were widely implemented to reduce supply risk, which often meant companies needed to find a second source of materials supply. However, the dependence on the region, particularly Chinese suppliers, continued.^[3] In the early 2000’s chemical capacity in India shifted focus to downstream cGMP manufacturing. This meant that supply chains for non-cGMP materials became even more dependent on suppliers in China. Chinese producers embraced a great deal of chemical technology and were willing to perform difficult to manage chemistries such as nitrations, fluorinations, cyanide chemistry, Grignard reagents, and many others that were difficult for Western producers to manage, particularly due to EHS constraints. Therefore the “value” that the downstream manufacturers were receiving was quite good as the supply was mostly dependable, the quality minimally acceptable, and the price very attractive.^[4] Risk-based supply chains continued to evolve through the 2000’s into the 2010’s and many customers noted that the Chinese chemical industry required an enhanced approach to EHS and quality, and the “value” of the supply chain was weakened as costs rose. Chinese supply of raw materials used in pharmaceutical production, however, had become well established. It has recently been estimated that 80% of active ingredients used in US pharmaceutical consumption come from China and India, with Indian companies also relying heavily on raw materials from China.^[5] Over the last few years, the security of supply of non-cGMP materials to customers has changed. As the Chinese government embraces more stringent EHS requirements, many manufacturing facilities have been closed due to poor environmental conditions, and the government has levied substantial environmental taxes on those who remain. The supply of materials from China has seen substantial price increases at a minimum, and often customers’ supply chains have been left with no qualified suppliers of non-cGMP materials.^[6] Also, overreliance on a small set of producers can lead to shortages in supply – for example, when a Chinese API manufacturer’s facility exploded in October 2016, a global shortage of an antibiotic drug occurred, since that site was the sole source of the drug.^[7] With the “value” of the value chain no longer driven primarily by price differentiation, the supply of non-cGMP materials is once again shifting – this time reducing the strong regional dependence of Asia, and particularly China, and embracing more Western producers so that the risk of the supply is diversified and reduced. While many Western producers reduced or removed older non-cGMP chemical capacity, some have remained engaged in the supply of non-cGMP materials for pharmaceutical supply chains. Western partners with deep experience in technology, manufacturing and

innovation for the pharmaceutical industry can decrease regional dependency for API supply, increase quality systems and provide the manufacturing and delivery service needed for ensuring uninterrupted availability of critical medicines for patients. Companies can benefit from engaging suppliers with assets for cGMP production as well as non-cGMP materials. Lonza is a case in point with over 600 m³ of chemical capacity at the Visp, Switzerland, complex that operates under a strict ISO quality system. The complex can manufacture early intermediates for both internal and external cGMP advanced intermediate and API supply, in response to changing demand dynamics for non-cGMP services. The right suppliers can also enhance the value chain by engaging the appropriate technologies in the appropriate facilities that drive competitiveness. Value Chain improvements are critical for all pharmaceutical products. The evolving global API production landscape offers new opportunities for companies to partner with suppliers who will add value throughout the API supply chain and reduce over-dependence on Chinese raw materials.

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A Wide Spectrum of Contract Services

September 21, 2018: With its pending \$425-million acquisition of Halo Pharmaceuticals, Cambrex joins other contract providers that have used acquisitions in recent years to build end-to-end service models that provide both active pharmaceutical ingredient (API) and drug-product development and manufacturing, including Lonza, Catalent, Patheon, and Alcamis among others. By inking the acquisition of Halo Pharma, a Whippany, New Jersey-headquartered contract development and manufacturing organization (CDMO), Cambrex, a contract manufacturing organization (CMO) of small-molecule APIs and intermediates, will enter the finished-dosage form CDMO market. Halo Pharma provides drug-product development and commercial manufacturing services, specializing in oral solids, liquids, creams, sterile, and non-sterile ointments. “This acquisition opens a completely new segment of the market for Cambrex in finished dose development and manufacturing,” said Steve Klosk, president and chief executive officer of Cambrex in a July 23, 2018 statement, in commenting on the acquisition. “Halo’s expertise in oral solids, liquids, creams and ointments fits well with our small-molecule API business and brings a substantial new customer base and pipeline of small-molecule products.” Halo Pharma operates two GMP-compliant facilities located in Whippany, New Jersey and Montreal, Québec, Canada. Completion of the transaction is subject to customary closing conditions and is expected to occur during the third quarter of 2018.

Company on the Move

The pending addition of Halo follows a series of investments by Cambrex in its small-molecule API capacity and capabilities. In June, the company announced plans to expand research and development (R&D) capabilities at its site in Paullo, Milan, Italy.

The company is investing to construct a new R&D laboratory and recruit additional scientists to increase the number of generic APIs in the company's development portfolio. Cambrex currently manufactures over 70 generic APIs. The company also installed a new pilot plant at the Milan site in 2017. In May, the company announced plans to begin a \$5-million expansion of laboratory facilities at its site in Karlskoga, Sweden. In 2017, Cambrex upgraded its continuous-flow capabilities in Karlskoga with a dedicated commercial-scale unit that is capable of producing multiple metric tons of high-purity API intermediates per year, and it installed new, large-scale manufacturing capacity at Karlskoga. Cambrex is also making other investments as part of its strategic plan to increase its development capacity and resources in North America. The company is progressing a new \$24-million facility for manufacturing highly potent APIs at its site in Charles City, Iowa. The project will also see the reconfiguration of an existing small-scale manufacturing area to provide a single high-containment building to support early-stage development and manufacturing. In January, Cambrex announced an investment to expand chemical and analytical development capabilities at its Charles City site. In 2017, Cambrex completed expansions of cGMP small-scale capacity and large-scale manufacturing capabilities at its Charles City site, which followed the opening of a \$50-million multi-purpose manufacturing facility there in 2016. Earlier in 2018, the company completed a pilot-plant expansion at its facility in High Point, North Carolina with the installation and commissioning of a fourth reactor suite, upgraded the site's analytical chromatography data systems for quality control and analytical R&D, and completed the installation of multiple continuous flow reactor platforms. Cambrex gained the High Point site, through its acquisition of PharmaCore, in 2016. At the facility, Cambrex produces APIs and intermediates in batch sizes from milligrams to 100 kg to support clinical trials from Phase I to Phase III.

Building End-to-End Service Models through Acquisitions

Cambrex joins other contract providers building their capabilities through acquisition and organically to become end-to-end service providers.

Lonza, a CMO of small-molecule and biologic-based APIs, built an end-to-end service model in small molecules through its \$5.5-billion acquisition of Capsugel in 2017. With the largest acquisition in the company's history, Lonza positions itself in the drug-product services sector by gaining formulation and oral dosage delivery technologies, including a position in hard-capsule technologies. In addition to Capsugel, Lonza acquired in 2017, Micro-Macinazione, a Monteggio, Switzerland-based provider of micronization services. The addition of Capsugel and Micro-Macinazione provided Lonza an integrated offering in small-molecule technologies by adding capabilities in dosage form and drug-delivery systems to complement Lonza's existing custom API development and manufacturing services. Lonza also has made internal investments to build capabilities for drug-product development and manufacturing to complement its API capabilities in small molecules and biologics. In November 2016, the company opened drug-product services laboratories in Basel, Switzerland, which included a new facility focused on formulation development, drug-product analytical development, and quality control. Lonza first announced plans to expand its pharmaceutical and biotechnology segment by offering development and manufacturing services for clinical outsourcing of drug products in February 2016 with a focus on parenteral dosage forms, including products for injection and infusion for intravenous, subcutaneous, intraocular and other routes of parenteral administration. Services include options for monoclonal antibodies, other biologics, drug conjugates, peptides and small molecules that require a parenteral dosage form.

Catalent, a CDMO of drug products and biomanufacturing services, made a large play in becoming an end-to-end provider with its \$950-million acquisition in 2017 of Cook Pharmica, a Bloomington, Indiana CDMO of biologic drug substances and parenteral drug products. The acquisition of Cook Pharmica provides Catalent capabilities in biologics development, clinical and commercial cell-culture manufacturing, formulation, finished-dose manufacturing, and packaging. The acquisition complemented Catalent's existing capabilities in cell-line engineering, bioconjugate development, analytical services, biomanufacturing, prefilled syringe, and blow/fill/seal technologies. With the Cook acquisition, Catalent gained a development and manufacturing facility in Bloomington, Indiana, as well as additional expertise in liquid and lyophilized sterile formulation, fill/finish across vials, prefilled syringes, auto-injectors, cartridges and safety devices, and biomanufacturing capacity to augment the company's biologics business. Catalent operates a biologics manufacturing facility in Madison, Wisconsin and has proprietary cell-line technology, GPEX. Its operations also include fill/finish services in Brussels, Belgium and Limoges, France; conjugation technology in Emeryville, California; and a network of biologics analytical locations. Following the acquisition, Catalent created a new, dedicated business unit focused on Biologics and Specialty Drug Delivery, which spans biologics development, analytical services, and drug-substance and drug-product manufacturing, in addition to Catalent's respiratory and ophthalmic platforms.

Patheon, which was acquired by Thermo Fisher Scientific for \$7.2 billion in 2017, started its strategy of becoming an end-to-end provider in 2014 with the formation of DPx Holdings, privately owned by the private-equity firm JLL Partners (51%) and Royal DSM (49%), which was the result of a \$2.65-billion deal between Patheon and DSM, completed in March 2014. The move provided Patheon with small-molecule API development and manufacturing capabilities as well as the biosolutions and biologic businesses of the former DSM Pharmaceutical Products. It added the API piece to Patheon's historical core competency in formulation development and drug-product manufacturing. Since then, Patheon has further built the API side of its end-to-end business with additional acquisitions. In 2017, Patheon added to its small-molecule development and manufacturing capabilities by acquiring Roche's API manufacturing facility in Florence, South Carolina. The site is Patheon's flagship US API operation for commercial-scale and mid-scale API production. In 2015, Patheon acquired Irix Pharmaceuticals, a Florence, South Carolina-headquartered company, specializing in making difficult-to-manufacture APIs. With the acquisition, Patheon secured additional API development and manufacturing services in the US, including high-potency and controlled substances and commercial API manufacturing at sites in Greenville and Florence, South Carolina. The acquisition of Gallus BioPharmaceuticals, a biologics CMO, completed in 2014, provided Patheon with US-based biologic drug substance sites in the US and complemented Patheon's two existing biopharmaceutical production sites in Groningen, the Netherlands and Brisbane, Australia, which the company secured through the DSM transaction.

Another end-to-end provider is **Alcami**, which became so through the combination in 2013 of AAIPharma Services Corporation (AAI), a CDMO of drug products, and Cambridge Major Laboratories, a contract small-molecule API manufacturer. Alcamí, which became the name of the combined company in 2016, is headquartered within Research Triangle Park in Durham, North Carolina, with 10 locations globally. Alcamí's services include: API development and manufacturing, solid-state chemistry, formulation development, analytical development and testing services, drug-product manufacturing (oral solid dose and parenteral), packaging, and stability services.

AMRI, historically a contract small-molecule API producer, built its capabilities on the drug-product side through several key acquisitions in parenteral drug development and manufacturing. AMRI entered the parenteral drug-product space with its 2010 acquisition of Hyaluron, which provided AMRI capabilities for manufacturing and sterile filling of parenteral drugs. In 2014, it acquired Oso Biopharmaceuticals (OsoBio), an Albuquerque, New Mexico-based contract manufacturer of injectable drug products with large-scale commercial production. In 2015, AMRI acquired Aptuit's aseptic clinical manufacturing site in Glasgow, UK. The addition of the Glasgow operation strengthened the company's front-end formulation expertise in its sterile injectable business to provide a single source for sterile fill/finish needs from formulation to commercial supply. AMRI now has four business segments: drug-discovery services, APIs, drug products, and fine chemicals.

Joining Established End-to-End Providers

Other companies also have end-to-end service models, both pure-play CDMOs/CMOs and the contract manufacturing arms of pharmaceutical companies. Almac, for example, a Craigavon, UK-headquartered company, offers small-molecule and peptide API development and manufacturing as well as solid-dosage development and manufacturing. **Recipharm**, a Jordbro, Sweden-based CDMO, also offers API development and manufacturing through its Paderno Dugnano, Italy facility, an API development facility in Uppsala, Sweden, and a beta-lactam plant for the lyophilization of bulk APIs in Lainate, Italy. On the drug-product side, it provides development and manufacturing services for solids, semi-solids, liquids, injectables, and ophthalmics.

CordenPharma is a contract provider of both small-molecule APIs and drug products (including solid-dosage products and sterile injectables), and it has made several recent expansions to add to its capabilities on both sides. In November 2017, the company acquired a former Pfizer facility, an API manufacturing facility in Boulder, Colorado. The site specializes in the development, scale-up, optimization, and production of highly potent and cytotoxic/cytostatic APIs from development quantities to commercialization. The acquisition of the Boulder facility is aligned with a broader corporate strategy of offering fully integrated supply (APIs, drug products, packaging, and logistics), including a broad range of expertise in the development and manufacturing of highly potent and oncology products. Also on the small-molecule API side, in 2017, the company announced an investment of €3.7 million (\$4.2 million) in the manufacturing site infrastructure of its CordenPharma Switzerland facility located in Liestal, Switzerland. The investment includes an expansion of the square footage dedicated to small-molecule, peptide, and carbohydrate development services as well as an approximate €2-million (\$2.3-million) investment in new automated development and optimization equipment. On the drug-product side, in 2017, the company completed the addition of an early-development suite for highly potent, oral solid dosage products in CordenPharma Plankstadt (Germany). The new facility allows for the production of small batches, from 100 g to approximately 1,000 g.

Another example of an end-to-end provider is **Siegfried**, headquartered in Zofingen, Switzerland, which provides both small-molecule API and drug-product (solid-dosage and sterile manufacturing/aseptic filling) development and manufacturing services. On the API side, it has facilities in Switzerland (Zofingen and Evionnaz), Germany (Minden), France (St. Vulbas), the US (Pennsville, New Jersey), and China (Nantong). On the drug-product side, it has sterile manufacturing/aseptic filling at facilities in Germany (Hameln) and the US (Irvine, California), and solid-dosage manufacturing at facilities in Switzerland (Zofingen) and Malta. Siegfried has further developed and expanded the company's global production network resulting in an integrated supply offering forward and backward integrated service and critical size expansion. The company has built its API and drug-product capabilities organically and through acquisitions. Among recent investments, in 2016, Chinese authorities issued Siegfried a final operating license for large-scale production at its API manufacturing plant in Nantong, China. Also, in 2016, the company's headquarters in Zofingen put into operation a new production building constructed in vertical flow technology in accordance with the latest technology. Siegfried also integrated three manufacturing sites (Evionnaz, Switzerland; Saint-Vulbas, France; and Minden, Germany) for intermediates and APIs that the company acquired from BASF in 2015. The acquisition of the BASF sites followed two earlier acquisitions on the drug-product side: the 2012 acquisition of California-based Alliance Medical Products, which added to the company's sterile-filling capabilities, and the 2014 acquisition of Germany-based Hameln Pharma, a provider of development and production of sterile liquid pharmaceuticals, which strengthened Siegfried's sterile-filling segment. In March 2018, Siegfried added to its drug-product manufacturing network with the acquisition from Arena Pharmaceuticals of a solid-dosage manufacturing facility in Zofingen. The company says it plans to grow within the value chain of its existing businesses by reaching critical size in the drug-product sector and through backward integration. Siegfried plans to diversify into adjacent new businesses by enhancing its technology base in micronization, lyophilization, spray drying, and by adding additional high-potent manufacturing capabilities.

Piramal Pharma Solutions, the contract manufacturing arm of the Indian pharmaceutical company Piramal, is another example of an end-to-end provider. In 2016, Piramal acquired the Riverview, Michigan-based contract small-molecule manufacturer, Ash Stevens.

Pfizer CentreOne, the contract manufacturing arm of Pfizer, provides custom small-molecule APIs and contract services for sterile injectables and highly potent oral solid dosage forms. Pfizer added to its sterile injectables contract business through its \$17-billion acquisition of Hospira in 2015, which added to the company's drug portfolio for sterile injectables and biosimilars but also provided contract sterile manufacturing services.