



ACHEMA

Worldwide News

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AchemAsia is the Platform to Present Innovations for China's Process Industry to a Key Audience.

A special edition from

PRO·CESS

2|2018

ARE YOU IN?

My name is Sinian Huang, and I am in charge of DEHEMA's network of supporting institutions. It is a quite comprehensive, very broad, occasionally complicated and always demanding network.

This network forms the foundation and domestic basis of AchemAsia. Simply put, you could call me "The face of DEHEMA" when it comes to our cooperation with Chinese partner societies, supporting institutions, and administrative or organizational bodies which have assembled around AchemAsia. All of this is the core of my daily profession.

As I was involved already with the very first AchemAsia way back in 1989—and never stopped being involved since then—I am passionate about ACHEMA's younger sister. So I strive hard to give my personal

contribution in order to make the event a success story.

Many things have changed in these past 30 years, and my home country has achieved an unprecedented advancement in a relatively short time which very well might be unique in human history. Honestly—I am of course proud of this! But, as with all changes, you have to react if you want to stay on track.

This is why we have decided, admittedly after some lengthy discussions, to change our event location from Beijing to Shanghai. We

"You have to react if you want to stay on track."

have also partnered with a new sales agent for the Chinese market who has a proven success record in the exhibition industry. We have chosen a new exhibition venue which offers plenty of space for the growth we expect for the years to come. And we have won some new domestic media partners which will help to spread our message locally.

We have furthermore realized how important it is to sharpen the exhibition profile to some degree. The generalist approach of ACHEMA where we present technological solutions for all areas within the process industries is not what my fellow countrymen want. So we have narrowed down the topical portfolio of AchemAsia to those fields within the chemical process industries which are being particularly addressed in China's current Five-Year Plan: Process Technology, Pharma Technology, Industrial Water Management, Plant & Process Safety, and Digitalization: These are our focal topics for AchemAsia 2019; this is where the action is in our industry.

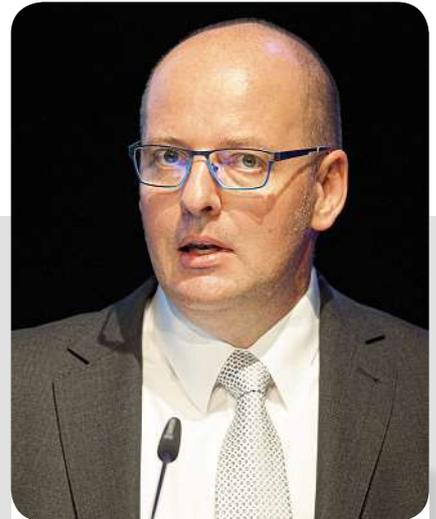
So we are ready for another exciting AchemAsia. And my only and final question is: Are you in?



■ **SINIAN HUANG**

DEHEMA Exhibitions ■

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SUCCESSFUL ACHEMA 2018 PROVIDED A LOOK AHEAD

Rarely before the process industry has faced similar changes and transformation processes. What ACHEMA visitors saw this year was nothing less than the future that will soon become reality everywhere. Flexible, digital and increasingly based on organic raw materials.

At the most important trade show for the process industry, more than 3,700 exhibitors from 55 countries showcased the latest equipment and innovative processes for the chemical, pharma and food industry. Whether in the classic process technology hall, the pump exhibition or in the plant engineering section, many stands were so crowded that visitors had to take some time to pass through the halls.

“The exhibitors we talked to as well as we ourselves, had a very successful show,” said Jürgen Nowicki, Chairman of the ACHEMA Exhibitors’ Committee and Speaker of the Linde Engineering Board. “Exhibitors’ feedback has been very positive,” agrees Dr. Thomas Scheuring, CEO DECHEMA Exhibitions. “The first results from the exhibitor and visitor survey also show that both sides were highly satisfied”.

By far the strongest growth was recorded by the Pharmaceutical, Packaging and Storage Technology exhibition group, where two additional halls were rented due to strong demand. In view of the strong trend towards digitization and automation, it is not surprising that the “Instrumentation, Control and Automation

Techniques” group was also able to grow. However, “traditional areas” such as mechanical process engineering and safety technology also occupied slightly more space, while other groups such as plant construction or laboratory technology recorded slight losses.

Behind Germany (1,644 exhibitors), China (342 exhibitors) and Italy (307 exhibitors) showed the largest number of exhibitors, both with significant growth compared to the previous event in 2015. The number of exhibitors from India and the Russian Federation also increased, as well as from Poland, South Korea and Turkey. The number of exhibitors from the Netherlands, Belgium and France remained constant, while the number of exhibitors from the USA, Austria and Great Britain declined. The proportion of exhibitors from abroad rose again to 56%, which is higher than ever before.

❖ ACHEMA 2018 in Figures

Exhibitors: 3,737
 Represented countries: 55
 Proportion of exhibitors from abroad: 56 %
 Germany: 1,644 exhibitors
 China: 342 exhibitors
 Italy: 307 exhibitors
 Exhibition space: 132,000 sqm
 Visitors: around 145,000

TWEET!



Higher international character, clear trends, satisfied exhibitors, but fewer visitors: these are the keywords to summarize AICHEMA 2018.

Source: Evonik; Natoli; ©Groenning - stock.adobe.com

A certain drawback for the organizers has been the decrease in visitors to about 145,000. The organizers explain this partially by the more complex registration procedure that had to be introduced due to the increasing security requirements for large events. "That certainly prevented some spontaneous visits," says Scheuring. "Nevertheless, we will analyze the numbers very diligently."

Augmented Reality Gains Ground
A very visible trend this year: At many stands the visitors could experience plants and equipment in "augmented reality" with the aid of special goggles or

even test their aptitude in completely virtual surroundings.

The three AICHEMA focal topics were very well received. Under the motto "Flexible Production" numerous exhibitors showed modular solutions and intelligent components for the plant of tomorrow. "Biotech for Chemistry" comprised process development and equipment from the lab to the fermenter that integrate biotechnological methods into the chemical industry. "Chemical and Pharma Logistics" put a spotlight on the advancing integration of the supply chain and attracted new target groups that are increasingly not "only" service providers

but systemic partners of the process industry.

Congress' Hot Topic: Digitization
In the congress programme, especially digitization, but also presentations on energy drew large crowds. It covered the entire spectrum of chemical process technology and biotechnology. On the first three days of the show, current topics in particular were dealt with on a separate theme day: resources, digitization as well as energy and climate. The PRAXISforums that were introduced in 2015 have been received very well, too. These events are located closely to the respective halls in order to bring together users and suppliers and they attracted many visitors.

The two panel discussions were also very well attended. The question "Plastic-Free Europe—is a plastic-free Europe possible and sensible?" was debated controversially. The panelists agreed that plastic is indispensable and that a combined approach is needed to address the problem of plastic waste. Of course, it is particularly efficient to avoid plastic waste wherever possible.

On the topic "digitization meets process industry", experts from industry and science discussed the challenges facing industry. Do companies have to change their business models in view of digitization? With regard to the right approach for the digitization of the process industry, the panelists agreed that every company should have a digital strategy that focuses on the customer. ■

Source: AICHEMA Daily



"We have had a lot of really good detailed project discussions, including a couple of direct orders. Investments are going on, and we expect a lot of good follow ups."

...✦ **Stephan Brand, Vice President Marketing, Director Turbo Business, Aerzen Maschinenfabrik**

"This was my first AICHEMA. I'm a process engineer and visited the show to find new products and technologies that can be used with our current processes as backup or for our plant."

...✦ **Eason Huang, LCY Chemical Corp., Taiwan**

Source: AICHEMA daily



THE BIOTECHNOLOGICAL ASSEMBLY ROUTE

In the shadow of “Industry 4.0”, a revolutionary change is taking place in biotechnology: In the interplay of miniaturization, automation and digitization, the development of biotechnological processes and products is being reinvented.

DR. KATHRIN RÜBBERDT*



Source: ©BillionPhotos.com - stock.adobe.com

Microreactors from 3D printers, multichannel pipettes, LIMS software for data acquisition and processing—biotechnological research and development has undergone some upheavals in recent years and decades. Now, however, the underlying developments—miniaturization, automation and digitization—are converging and can lead to a paradigm shift that fundamentally changes development strategies, business models, but also the working world and education.

Some trends are already obvious: Thanks to automation, more than 10,000 genetically modified strains can now be specifically produced and automatically tested in just one week. Enzyme development is going in a similar direction. Modularization, as is evident in synthetic biology with its “modular concepts”, has changed the way scientists think about biotechnology and opened it up to an engineering approach. The example of gene sequencing in particular shows how automation and miniaturization have led to the shrinking of devices—gene sequencing is currently already possible on a USB stick-sized device—and development times have been extremely shortened.

However, the effects are not limited to the molecular level. The cultivation of microorganisms also takes place in microsystems that are “supervised” by laboratory robots. With microfluidics, we are on the way to the next miniaturization stage. Algorithms are now also available for evaluating the large amount of data generated by the new automated methods—and biotechnology, with its enormous number of relevant measured values and parameters, seems virtually predestined for “big data” methods and artificial intelligence.

And the developments are not limited to the laboratory. Production process data will soon be digitally available and us-

* K. Rübberdt is Head of Biotechnology at DECHEMA e.V.

able at any time in the same way as laboratory data in order to enable continuous integrated improvement and further development of production processes that are already running. Online sensor systems for the essential biochemical parameters, which are often not selectively accessible, play an important role in this. Today, indirect measurement methods are used to generate large amounts of data from which, in combination with intelligent evaluation algorithms, relevant system information can be obtained. At the same time, the sensors themselves will become “smart”: Capacities for complex signal processing are transferred from the central control system to the sensors. This not only reduces the load on the data lines, but also significantly shortens reaction times. At the same time, the sensors can perform self-diagnosis and provide information on the process; even predicting process sequences becomes possible.

New Business Models

All this is revolutionizing the way new products are developed and efficient manufacturing processes designed. The first companies—especially in the USA—have already adopted the new concepts and are developing new business models based on them, for example as development service providers or by setting up databases from which the appropriate molecules can be selected for the desired application. However, many companies are still reluctant to develop new biotechnological processes and products; the scientific and economic risks resulting from difficult to calculate development times, volatile markets and constantly growing demands on flexibility are too great. It is precisely here that the combination of automation, miniaturization and digitization could open up new possibilities, in which process development can be accelerated and better planned and process understanding improved at the same time.

With a view to industrial biotechnology and the bioeconomy, it is even possible to think one step further. Information about these raw materials is essential for competitive processes based on renewable raw materials: where and in what quantities are they available, what is their quality and composition? A whole series of research projects at regional, national and European level are currently investigating how this data can be made

available. In order to make processes possible in which different raw materials are used flexibly, this information must also be integrated into the processes—up to and including data on logistics, so that the raw material reaches the right place on time.

The Role of People

What role will people play in this data-driven world of tomorrow? There are two conceivable scenarios that are not mutually exclusive: On the one hand, people will have to adapt to automated processes. The laboratory employee will then have tasks such as non-automated handouts and technical maintenance work, controlled via data glasses and with the aid of augmented reality technology. On the other hand, the biotechnologist becomes the conductor of the orchestra of laboratory robots, automata and computers, who plans experiments from his computer workstation, interprets complex data sets and gives new impulses for research.

Human beings will thus play the role of final information assessors and process decision-makers. Education will have to adapt to this. To achieve this, universities and colleges need the latest technologies and intelligently networked laboratory environments. At the same time, the biotechnologist of tomorrow must also have a basic understanding of biotechnological and process engineering processes in order to identify sources of error in good time and make well-founded decisions.

Preparing the Framework

Miniaturization, automation and digitization are often uncoordinated and are not (yet) perceived as a coherent phenomenon. In order to fully exploit the potential, but also to be able to assess possible consequences in good time, technological developments must be actively observed, accompanied and evaluated. The integration of technologies, for example in overarching platforms, plays a key role. Data formats and interfaces must be defined and standardized in good time so that integration becomes possible at all. And the economic and social consequences of these developments, from the question of affordability to new framework conditions for the world of work, should already be considered today so that the new impetus for biotechnology can be successful. ■

WHAT ARE THE GOALS OF INDUSTRIAL WATER 4.0?

If chemical production continues along its path to increased flexibility and increased digitalization, what does this mean for industrial water – which is used as a coolant, solvent, reagent or product ingredient and forms an integrated part of the processes? We talked to Dr. Thomas Track, Head of Water Technologies and Water Spokesperson at DECHEMA.

• **Dr. Track, what was the background and the motivation for writing the DECHEMA paper “Industrial Water 4.0”?**

TRACK: With close links to the process industry, DECHEMA has been working on the subject of digitalization for many years. Back in 2014 we already published our ProcessNet position paper on “Trends and Perspectives in Industrial Water Technology,” which defined the necessity for and challenges associated with closer interlinking of industrial water management, production and other actors in communal (waste) water management and water resources management. Today, the increasing flexibilization, digitalization and interlinking of production as part of Industry 4.0, for example due to developments toward smaller batch sizes or toward the manufacturing of personalized products, also demands greater flexibility and digitalization in industrial water management. This is why we believe that it is absolutely vital that a interconnected industrial water management system is developed in the sense of Industrial Water 4.0. We also see this as a further development step toward a digitally optimized, integrated water management.

• **Where are we at in terms of the digitalization of industrial water management?**

TRACK: Water is a key production factor for industry. While digitalization of industrial production and the process industry is moving ahead rapidly, the degree of digitalization in industrial water management has not yet reached a comparable

level. Individual elements of digitalization are, for example, already being used in the areas of commissioning, control and maintenance of plants. However, we do not yet have comprehensive digital integration throughout the entire lifecycle of industrial water treatment plants.

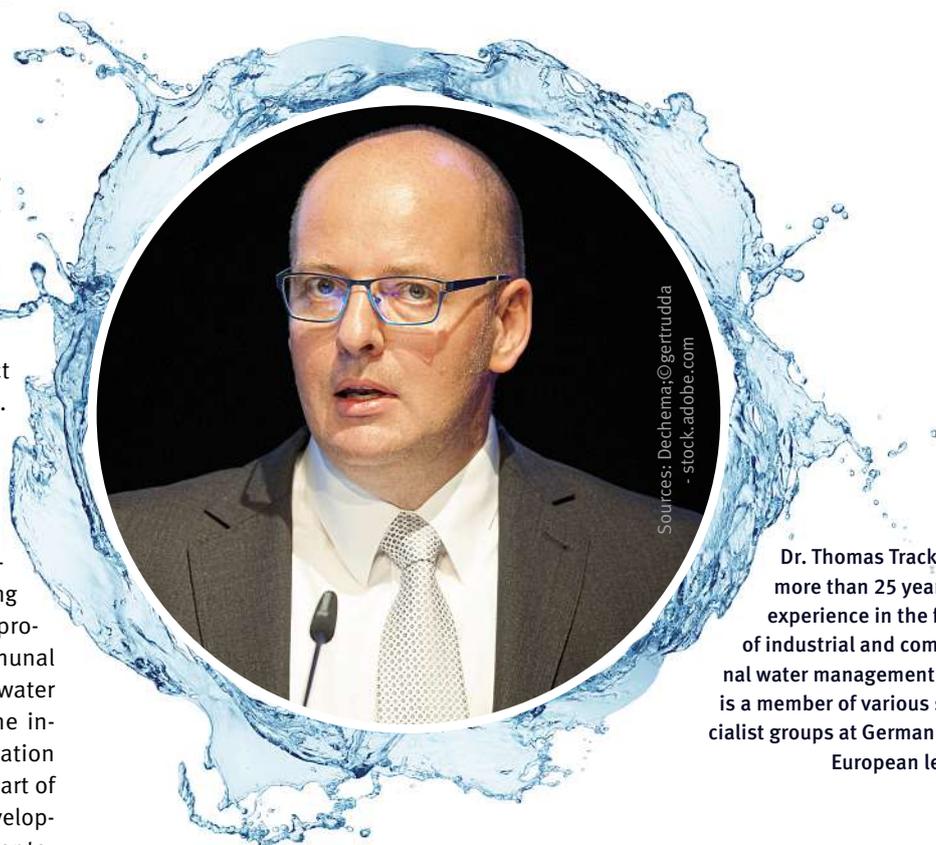
• **What options do you see for dovetailing with digitalization in industrial production, and what potential does this offer in terms of economic efficiency and conservation of resources?**

TRACK: The increasing digitalization across industry also makes demands on industrial water technology on account of the close links between water management and production. What this means for industrial water technology is that, on

the one hand, the increasing flexibilization in production needs to be supported through efficient provision of corresponding water qualities. On the other hand, it goes without saying that waste water treatment needs to be able to handle a greater bandwidth in terms of process wastewater characteristics. The digital cross-linking of both areas offers benefits in terms of reaction times and information depth. Both are indispensable for an economical industrial water management that handles resources responsibly and sustainably.

The interview was conducted by Hans-Jürgen Bittermann, freelancer with PROCESS.

The DECHEMA Paper “Industrial Water 4.0” is available free of charge in German and will soon be available in English. https://dechema.de/Industriewasser_4_0.html



Dr. Thomas Track has more than 25 years of experience in the field of industrial and communal water management and is a member of various specialist groups at German and European level.

- The paper draws a distinction in terms of the vertical and horizontal integration of digitalization. Can you please outline briefly what is meant by this?

TRACK: This differentiation is derived from Industry 4.0. In Industrial Water 4.0 we have taken this up from the point of view of integrated industrial water management. Here, the vertical element is digitalization in industrial water management itself, comparable to the production processes for Industry 4.0. The horizontal integration stands for the digitalization of interfaces to independent sectors. What we are looking at here is networking with industrial production on the one hand and with communal water industry, wastewater management and water resources management on the other. Via the dovetailing with industrial production, we have already addressed one of the total of three integration interfaces of Industrial Water 4.0.

- As you have already mentioned, the level of digitalization in the world of water management has not yet reached a comparable level to that in the process industry. What do you think still needs to be done?

TRACK: We need to anchor digitalization in the industrial water industry in such a way that the water and wastewater treatment plants evolve into adaptive systems that interact with their surroundings. One example of this is the adjustment to higher and faster variability particularly in the composition of wastewater. This demands new optimization approaches to ensure high efficiency of the (waste) water treatment systems even under these dynamic framework conditions. This means in particular that wastewater treatment plants are going to need to be able to adapt autonomously in order to increase their performance level or to re-



“The heatwave in the summer of 2018 has shown us again quite how much the process industry depends on its links to water resources management.”

... Dr. Thomas Track

spond flexibly and autonomously to planned or unplanned events and conditions without any loss in performance.

- How can this be done?

TRACK: In addition to the pure digitalization of the operation of these facilities, we also need to address some other areas. These include, for example, the development of new sensor technology or the refinement of existing systems, cross-functional modeling and controlling, but also non-technical aspects such as employee development and support or the clarification of legal issues.

- What will the interfaces between the communal and industrial levels need to look like, and what links between digitalized communal water management and water resources management make sense?

TRACK: In order for water management to be both commercially efficient and ecologically efficient, there must always be an interaction with at least one of the two water management areas. Both sectors can profit from digitalization at this horizontal interface, and the interconnectedness becomes particularly advantageous if, for example, modular and flexible systems simultaneously enable demand-driven utilization of the communal and industrial wastewater infrastructures.

New technologies and modeling instruments in process control engineering and IT are making this possible. However, digital networking also supports the reuse of wastewater or the purification of wastewater containing new types of substances, environmentally harmful ingredients, nutrients or valuable substances. More far-reaching links such as the controlling of cooling water infeed temperatures as a function of rainfall runoff and temperature for sensitive receiving waters are also conceivable. Particularly during this year’s heatwave in Germany, it has been shown again clearly quite how much the process industry in particular depends upon its links to water resources management.

- Last but not least, Dr. Track, what are your recommendations in terms of IT security?

TRACK: In many areas the requirements for Industrial Water 4.0 are no different to those for Industry 4.0. The security of cyber-physical production systems, or CPPS for short, plays a particularly important role for interactions beyond company limits. On the one hand this relates to the integration of industrial water management and production, as water management is often outsourced via operator models, or at least remote maintenance is performed on subsystems. On the other hand, the integration of industrial and communal water management systems places high demands on IT security on both sides. In addition, a reliable framework for legal and liability issues is required, particularly at the interfaces. Just like the interaction with the working world, both of these aspects — IT security and a clear legal framework — are prerequisites for the acceptance and successful implementation of digitalization solutions.

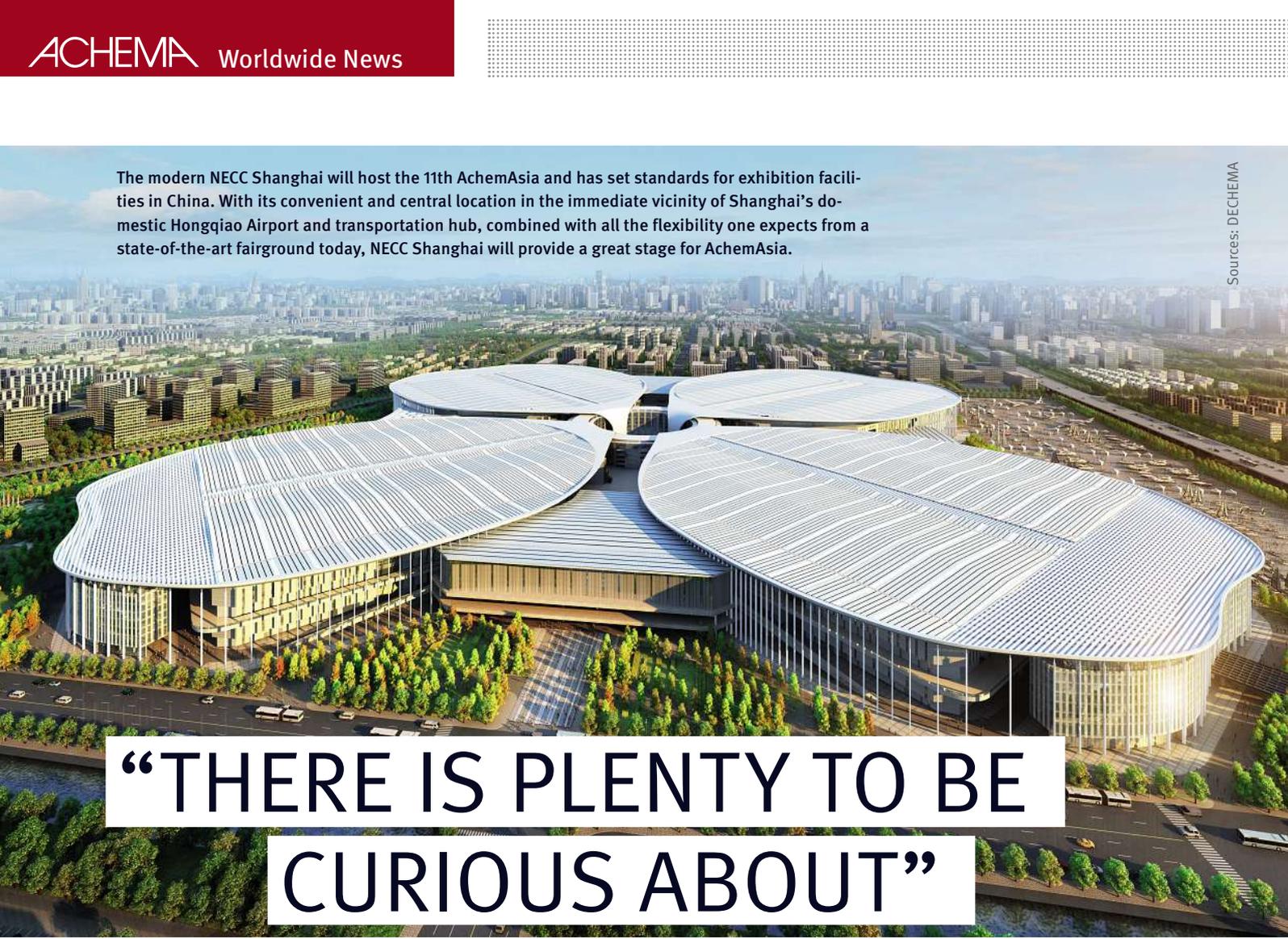
- Dr. Track, thank you very much for talking to us!

... Water Events by DECHEMA

Industrial Water 2018, 27–29 November 2018, Frankfurt/Germany:
The biennial platform on challenges from applied research and technology development to solutions and industrial water use
#industrialwater
www.dechema.de/industrialwater

IWA Water Reuse 2019 – 12th International Conference on Water Reclamation and Reuse, 16–20 June 2019, Berlin/Germany:
Reducing water stress regionally and worldwide
#IWAReuse2019
<http://iwareuse2019.org>

The modern NECC Shanghai will host the 11th AchemAsia and has set standards for exhibition facilities in China. With its convenient and central location in the immediate vicinity of Shanghai's domestic Hongqiao Airport and transportation hub, combined with all the flexibility one expects from a state-of-the-art fairground today, NECC Shanghai will provide a great stage for AchemAsia.



“THERE IS PLENTY TO BE CURIOUS ABOUT”

Since its establishment thirty years ago, AchemAsia has become the prime networking hub for suppliers of the process industries. With the upcoming show being already the 11th event in a row, AchemAsia is the platform to stay in touch with the rapid changes China's process industry is facing today. Or, in other words: This is the occasion to seize opportunities which might be less obvious than in the early years — but are still there.

There is no other economy in the world which comes even close to China's modernization pace and economic drive. And the demand for innovative solutions in the process industries is probably higher than ever. At least this is the conclusion to be drawn from China's current Five-Year-Plan. At the same time, there is no other event in China for the chemical process industry which rivals AchemAsia in terms of visibility, international reputation and networking potential. What is new in this eleventh edition of the International Expo and Innovation Forum for Sustainable Chemical Production? Dr. Thomas Scheuring, CEO DECHEMA Exhibitions, promises: “There is plenty to be curious about in the Chinese process industries” ...

• **Dr. Scheuring, this AchemAsia has more new aspects than any of the previous ones. The most obvious one is the move of venue. What are the reasons?**

SCHEURING: We have decided to go to Shanghai, as Beijing no longer is the center of gravity for our industries. And we have also narrowed down the topical scope to match the new headline “International Expo and Innovation Forum for Sustainable Chemical Production”. It is illustrated by five key focal topics: Process Technology, Pharma Technology, Water Management, Plant & Process Safety and Digitalization. These focal topics are related to current priorities in the Chinese five

year plan. We are convinced that this AchemAsia will give a fresh impact to the event in general.

• **What will stay the same?**

SCHEURING: Our proven network provides continuity—it is based on in some cases decade long cooperation and trust. We have expanded it by adding some new partners, including a new sales representative for China.

This network is our foundation that we are very proud of, and of course we don't change that.

• **Have you had any reactions to the change of venue yet?**

» ***AchemAsia 2019 is the platform to present innovations for China's process industry to a key audience.***

SCHEURING: Only positive ones — of course, we have discussed the change with our partners and key exhibitors in advance. In general, all of our clients and customers are giving us a quite positive feedback.

• **AchemAsia takes place the year after ACHEMA, the global show of the process industries. If I attended ACHEMA 2018, why should I still come to AchemAsia?**

SCHEURING: In short: Different companies, different topics and a different conference programme. At AchemAsia, you will see a different perspective on the process industries. The Chinese market is not the world market, even if it is one of the most important markets today. AchemAsia will focus on solutions especially for the Chinese market, and we also expect Chinese exhibitors that didn't come to Europe. As a visitor, you can expect to get an overview of current technology particularly for the Chinese process industry sector that you won't see in that combination anywhere else.

• **Exhibition and conference are closely interlinked at AchemAsia. What will the conference cover?**

SCHEURING: The conference programme consists of symposia that address subjects of practical relevance or special interest. They are individually organized and seamlessly integrated into the exhibition. Topics are: Resource efficiency & process intensification, Future production in chemical and pharmaceutical industry, Pharma meets production, Advances in industrial water management, Play it safe – new concepts for process and labour safety, State of the art fluid handling, Materials for renewable

» AchemAsia puts the most recent growth and core sectors of China's process industry in the center of focus, with sustainability as anchor theme.



“AchemAsia’s goals in a nutshell: To offer international players a reliable networking platform in China, and to help Western SMEs which cannot afford a permanent branch office in the country to reach out for the market.”

... Dr. Thomas Scheuring,
CEO DECHEMA Exhibitions

energy production and storage, Digitalization and an AchemAsia PRAXISforum on new products and services.

• **Why have you decided on key focal topics rather than showcasing all aspects of the process industry?**

SCHEURING: My impression is that our Chinese attendees don't like the generalist touch we have at ACHEMA. They come with quite precise ideas what they want to see. We are responding to this by concentrating on some key issues of our industry. That implies, of course, that for the AchemAsia after, the focus topics might change because we want to address the current five year plan.

• **Which topics are the strongest drivers for the Chinese process industries that are reflected in this program?**

SCHEURING: Ranking those topics is difficult. The pharma sector is a strong growth driver worldwide, and this will also be visible at AchemAsia. Process Technology as a key topic is of course the very heart of AchemAsia. Water Management reflects on the scarcity of this precious resource in China and solutions how to lessen the stress on natural resources. Digitalization is about to revolutionize

our industry, and this will also show at AchemAsia. And safety for the plant and for the people is an essential key issue that speaks for itself.

• **What visitors do you expect?**

SCHEURING: Chinese visitors will be the strongest group, but with the clear focus on easy accessibility of the venue we expect also a strong attendance from outside China. The venue is located in close vicinity of the Hongchao Airport, and two hours flight time from there does not only cover China, but the whole of South-East Asia.

• **One of AchemAsia’s slogans in the past was “Gateway to the Chinese process industries”. How would you describe it today?**

SCHEURING: Well, the slogan still fits. Admittedly, there are many events today that offer this gateway, the event landscape has grown tremendously. We have been in China for thirty years by now and have been one of the very first to understand the importance of the Chinese market. Today, everybody acknowledges that China is the number one region for the chemical industry. So, besides being a gateway into China, AchemAsia is also a forum where Chinese companies present innovations that provide a model for their Western competitors.



Technology you can touch at AchemAsia 2019

» AchemAsia 2019 — Quick Facts

Established:	1989
Number of Exhibitors:	400 plus (expected)
Exhibition Area:	6,500 sqm
Attendees:	13,000 (expected)
Exhibition Venue:	NECC Shanghai
Booth Rental:	from € 359.10/sqm; prime location € 513.-/sqm
National Pavilion:	German group participation confirmed

For more information refer to www.achemasia.de or www.achema.com.cn

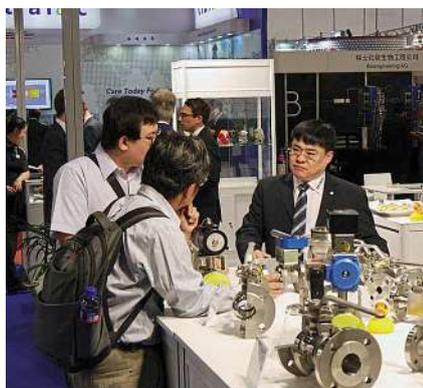
ACHEMASIA 2019
21–23 May 2019
Shanghai, PR China

• **Where are the Chinese companies especially strong?**

SCHEURING: I visited China on a business trip a couple of weeks ago and I was really impressed by some of the pharma tech companies we visited. Also the efficiency in chemical engineering has increased tremendously. From a Western viewpoint, there are plenty of developments to be curious about.

• **In the current global environment of trade conflicts, what role can AchemAsia play?**

SCHEURING: I am a strong believer in free trade. If you look back in human history over the centuries, human wealth has always been based on free trade. In the long run, trade wars have always resulted in losses for everybody. Our ambition is to offer a neutral platform that is accessible to everybody, and I do expect an intensification of European-Chinese and especially German-Chinese business relations that everybody can profit from.



Experts are on the lookout for new technologies and innovative ideas.

••• **From the Attendees' Viewpoint**

What will attendees get from AchemAsia? They will ...

- obtain first-hand information on recent trends in China's process industry
- identify present technological demand
- listen to senior speakers discussing China's investment strategy
- meet our industry's most important Chinese companies at one venue
- introduce products and services to potential clients
- learn from the experience of top investors
- discuss with potential cooperation partners

••• **AchemAsia 2019 Conference**

The exhibition will be accompanied by a conference with an innovative and interactive layout, seamlessly integrated into the exhibition. Satellite symposia on focal topics will be individually organized in cooperation with DECHEMA's partner associations. Key aspect is addressing topics of practical relevance or special interest from a Chinese viewpoint:

- Resource efficiency and process intensification
- Future production in chemical and pharmaceutical industry
- Pharma meets production
- Advances in industrial water management
- Play it safe – New concepts for process and labour safety
- State-of-the-art in fluid handling
- AchemAsia PRAXISforum: New products and services
- Materials for renewable energy production and storage



••• **What Are AchemAsia's Success Features?**

- Most international – and most visible – event for China's process industry
- Face-to-face communication with experts and decision makers
- Partnering arena among China's trendsetters
- Stepping stone to investment decisions
- Showcase for innovations
- Integrated technical solutions for key sectors of the process industry
- Opportunity to recruit new personnel
- Synergies through DECHEMA's global network

The successful positioning of AchemAsia is the result of DECHEMA's commitment to the Chinese market since the mid eighties. Back then China's role as global economic power was barely conceivable. And now DECHEMA's efforts of three decades constant work to establish a comprehensive domestic network pay off!

••• **Why China Remains a Business Destination**

No One Can Afford to Ignore

- The world's number one in foreign investments
- The world's second largest consumer – and third largest producer – of chemical products
- Solid forecast: economic growth will continue!
- Shift from export-driven, commodities' economy to high-tech value creation
- Government driven import initiative to achieve import-export balance
- Successful reform policy
- Steady adaptation to market economy structures
- Rapidly growing domestic market due to rising middle class
- Global powerhouse for the production of industrial goods
- Increasing competitiveness of products "made in China"
- Chemical process industry in pole position within China's economy
- Substantial progress in the protection of intellectual property rights

ELECTROLYSIS: THE KEY TO NEW VALUE CHAINS

Electrolysis plays a key role in almost all processes. Water electrolysis is a central part of this process. The hydrogen obtained by splitting water can either be used as an energy carrier, for example for fuel cells, or fed into the production of chemicals. A large number of industrial projects reflects on the importance of this technology: New construction projects are reported on almost daily, from the local hydrogen cogeneration plant to mega-projects such as the planned 10 and 20 MW projects announced by Akzo Nobel and Shell at the beginning of 2018. At the same time, the development of electrolysis cells is progressing: new electrode materials or developments such as PEM electrolysis cells ensure that the processes become increasingly efficient and, depending on the further use of hydrogen, also economically competitive.

And for some time now, attention has no longer been focused solely on hydrogen production. The co-electrolysis of water and carbon dioxide into synthesis gas is also currently being investigated in more detail. For example in the Rheticus research project, Siemens and Evonik are working on a process for converting carbon

dioxide into butanol and hexanol with the aid of regenerative electricity and microorganisms. Siemens is supplying the electrolysis technology and is developing the first gas-gas electrolyzer on an industrial scale.

Even though the focus is on the production of valuable chemicals, the process also has a second aspect that makes it particularly interesting for coupling to renewable energy sources: It can be adjusted up and down within a certain range and could therefore use more or less energy per unit of time, depending on the amount of electricity available. This applies only to a very limited extent to the classic electrolysis process, chlor-alkali electrolysis. Because the chlorine formed is the starting point for many other chemicals, the production quantities cannot be reduced without further ado.

But even in this supposedly mature process, there is still potential for innovation: for example, the use of oxygen depolarized cathodes has made it possible to reduce Covestro's energy consumption for chlorine production by up to 30 %.

❖ **Further information:**
www.dechema.de/electrolysis



The PEM ("Proton Exchange Membrane") electrolysis module developed by Siemens, currently the world's largest, can produce 1200 cubic meters of "green" hydrogen per hour.

Source: ©Brian Jackson - stock.adobe.com



❖ International Events Organized by DECHEMA

- **January 30–31, 2019:**
Gene Therapy – Ready for the Market?
(Frankfurt, Main/Germany)
- **February 12–13, 2019:**
PRAXISforum "Future Production in Chemical and Pharmaceutical Industry"
(Frankfurt, Main/Germany)
- **February 21–22, 2019:**
28th ATC 2019: Industrial Inorganic Chemistry – Materials and Processes
(Frankfurt, Main/Germany)
- **March 7–8, 2019:**
International MolMod Workshop
(Frankfurt, Main/Germany)
- **April 9–10, 2019:**
PRAXISforum "Big Data Analytics in Process Industry"
(Frankfurt, Main/Germany)
- **May 27–29, 2019:**
Himmelfahrtstagung 2019: Intensification and digitalization for integral bioprocessing
(Hamburg/Germany)
- **June 11–14, 2019:**
13th International Workshop on Polymer Reaction Engineering
(Hamburg/Germany)
- **June 16–20, 2019:**
12th IWA International Conference on Water Reclamation and Reuse
(Berlin/Germany)
- **June 23–27, 2019:**
17th International Conference on Carbon Dioxide Utilization
(Aachen/Germany)
- **June 25–26, 2019:**
PRAXISforum "Additive Manufacturing" (Frankfurt/Germany)
- **August 18–23, 2019:**
EuropaCat
(Aachen/Germany)
- **September 3–4, 2019:**
PRAXISforum "Lab of the Future"
(Frankfurt/Germany)
- **October 27–30, 2019:**
EuroMOF 2019 – 3rd International Conference on Metal Organic Frameworks and Porous Polymers
(Paris/France)

❖ Further Information:

dechema.de/veranstaltungskalender

Source: Siemens