



Messe München

THE
MESSE
MÜNCHEN
MAGAZINE
01
2019

THE DISCOVERY OF LIGHT

How optical technologies are revolutionizing
our lives

ON RISK

Climbing veteran Stefan Glowacz and investor Benedict Rodenstock
on the art of making the right decision

IN SAFETY

How cyberexperts on secret missions find data leaks in companies



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Peacock Throne in Linderhof Castle © Bayern.by - Gert Krauthauer

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DEAR READERS

»
*A visit to the trade fair means:
 experiencing trends in
 real time and up close.*
 «



It's time for some exercise! With the opening of our company gym at the Messehaus (administrative building), employees of Messe München have been able to keep fit in the workplace on a daily basis since the beginning of the year. A health coach helps employees find their own personal balance between health and work commitments.

We're keeping pace! In the past year, Messe München achieved an important strategic goal: With an annual turnover of around 418 million euros, we are for the first time in second place among trade fair companies in Germany.

A visit to the trade fair means: experiencing trends in real time and up close. This happens,

for example, at the Laser World of Photonics, where the resource of light takes center stage. Light is old, older than humanity—and yet one of the most exciting industries of the future is growing up around light and optical technologies: photonics. The cover story of this issue reveals the many uses of this futuristic technology, in which Germany is a leader.

The current issue of Messe München Magazine provides even more glimpses into the world of tomorrow. For example, look over the shoulder of the people who protect firms from cyber-attacks. Read the summit talk on the topic of risk or learn more about our health coach and

other Messe München employees in the Creators section. How are you getting fit for New Work? Write to me on my personal LinkedIn account.

KLAUS DITTRICH
 Chairman of the Management Board
 of Messe München



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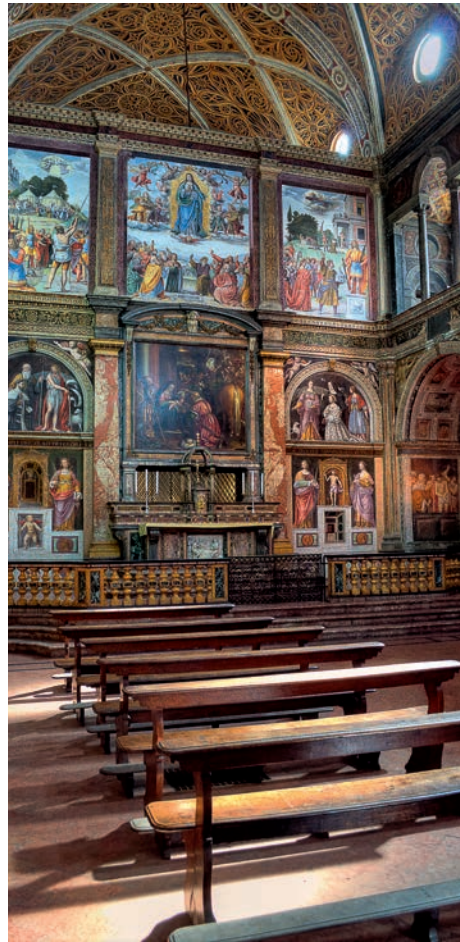
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It needn't always be La Scala—our colleague gives insider architectural and culinary tips for the northern Italian metropolis

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Cover photo: © Craig Burrows



COMMUNICATIONS TECHNOLOGY



IT'S GOING TO GET CROWDED IN SPACE

As we write in the year 2019, there is high-speed Internet all over the world. Everywhere in the world? Not exactly. There are still numerous regions of the world where the information superhighway is more like a country lane. Therefore, the US-based company OneWeb is planning to create universally accessible Internet connectivity via a fleet of many hundreds of satellites in near-earth orbit. The initial start with six satellites took place at the end of February 2019. However, OneWeb has not announced an exact starting date for the actual start-up. There are many competitors in the race to provide a network from space. Besides Canadian satellite operator Telesat, Elon Musk's space travel company SpaceX is pursuing a similar project, named Starlink, which plans to have around 12,000 satellites—that would be six times as many as are currently in orbit. If the plans succeed, the entire world would finally be connected. But there are still numerous hurdles to get over. Among other things, satellites will have to be produced in greater numbers and also much more quickly and cheaply than is possible at the moment.

FINANCES



BANKS ON THE BRINK

The financial industry is under pressure again. Thanks to low interest rates, political uncertainty, weak stock markets, and high real estate prices, there are no longer any easy solutions for customers such as banks. However, trust has grown since the financial crisis. And, since that time, many customers no longer rely on universal banks, but instead on specialized providers they reach using their cell phones—and which offer price and competence advantages on individual services. Therefore, it is no surprise that more and more tech companies are now entering the disruptive German market with Apple Pay and Google Pay. According to a study carried out by Bain, 51 percent of the 152,000 bank-customer respondents are able to imagine purchasing financial products from a technology company.

TRUST IS EVERYTHING

According to a Bain study, Germans still trust their home banks more than any technology provider. The number of years the bank has been in business is not important. ING and DKB have the most loyal customers.

E-SPORTS



NETFLIX OF THE FUTURE

Games are not just games anymore. They have developed into an entire entertainment industry—with competitions in stadiums reaching millions of fans via live streaming. E-sports have thus grown to become serious competition for Netflix & Co. They are all vying for a limited resource: the user's screen time. That is, the time that viewers spend in front of their screens. The enormous attractiveness of video games is lifting the revenue projections of the industry into the hundreds of millions for 2020. The revenue sources are varied. They include sponsoring, ticket sales, media rights, and display ads on streaming platforms. Germany is the fourth-largest market for this—behind the USA, South Korea and China. It will get very serious in 2024, at the latest: Experts expect that electronic games will become an Olympic demonstration sport at the Summer Games in Paris.

IFAT



IT'S MOVING FORWARD—THE WORLDWIDE ALLIANCE AGAINST PLASTIC WASTE

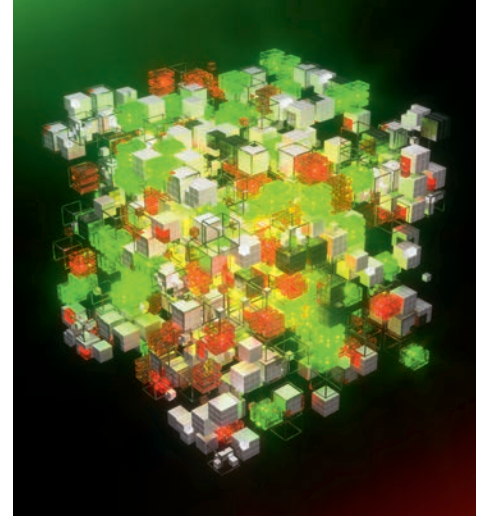
One of the greatest environmental problems of our time is the world's plastic waste that is not properly disposed of. Some 150 million tons of it are floating in the world's oceans alone, with up to twelve million tons of plastic waste being added every year. In March of this year, a whale was stranded in the Philippines—biologists found 40 kilograms of plastic in its stomach. This is just one dramatic example among many of where and how disposable articles such as plastic bottles, plastic cutlery, drinking cups and lids, packaging materials, cigarette butts, or cotton swabs are damaging the environment.

In addition to politics, industry and business have recognized the urgency of the plastic waste issue and have founded a new worldwide alliance: AEPW (Alliance to End Plastic Waste). The organization currently comprises some 30 businesses. They have committed to invest one to 1.5 billion USD in solutions within the next five years in order to contain the waste. There is unanimity on the fact that product designers, plastic manufacturers, and waste disposal companies must cooperate more closely in the future. A product designer who wants to combine various types of plastic for packaging must know how they will be separated, disposed of, and recycled at the end of the useful life of the packaging.

AEPW has therefore set the goal of avoiding waste and adapting product design accordingly. The products should be recyclable. But this can only function with cooperation across all industries. The global alliance is sharply focused on this and is bringing participants from the most diverse industries together.

Ifat is contributing to networking these industries. The world's leading trade fair for environmental technologies is presenting strategies and new solutions in the areas of water, sewage, waste, and raw materials management in order to employ resources in intelligent cycles in such a way that they are preserved for the long term. In the year 2019 alone, Ifat linked in six foreign trade fairs—three in China and one each in South Africa, India, and Turkey—global players in their industries and developed sustainable networks for intelligently recycling waste in the future. Ultimately, the plastics manufacturers and their disposal contractors are in the same boat and have the same goal: to fight against plastic waste.

TECHNOLOGY



A QUANTUM LEAP

For a long time, a computer that performs calculations using individual atoms was a physicist's pipe dream. Since conventional chips have reached the limits of their performance potential, that dream has to come true now. Today, more than 70 working groups around the world are dedicated to the quantum computer, and the number of scientific discoveries is rapidly increasing. The reason behind the race for this revolutionary technology: The quantum computer can carry out many calculations at the same time. Today's computers—even the most powerful among them—can carry out only one calculation after another. The quantum computer, however, juggles millions of values simultaneously. This groundbreaking speed will make far-reaching applications possible. For example, complex simulations will help prevent traffic jams in megacities. In addition, the technology will exponentially advance the topic of the future, artificial intelligence.

WHEN IT SHINES

BY MICHAEL MOORSTEDT | PHOTO: CRAIG P. BURROWS



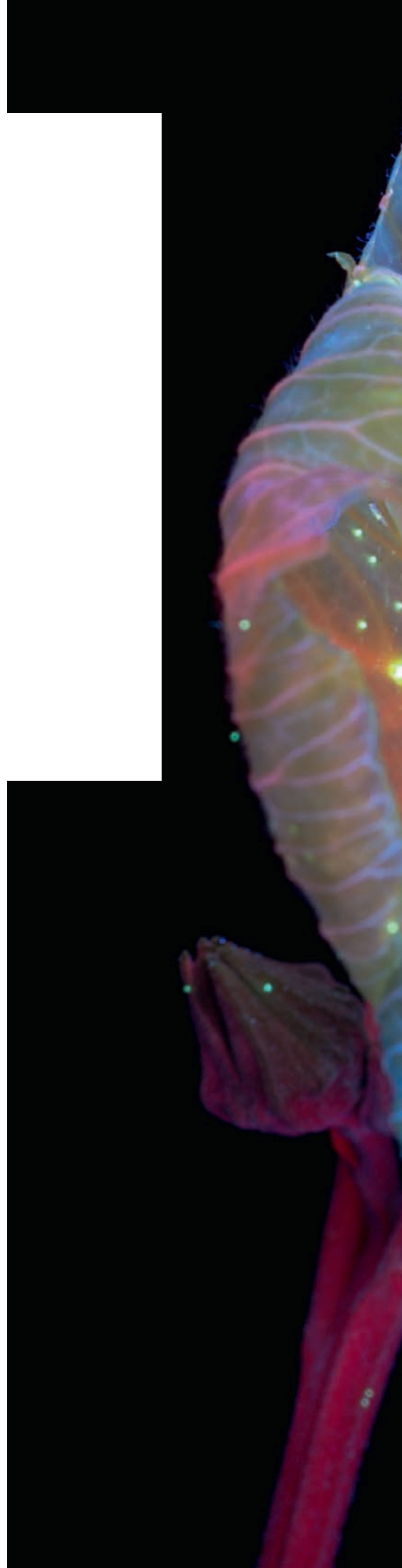
It makes 3-D printers and laser scalpels possible, and enables machines to see and cars to drive themselves—this is how photonics is shaping our future

On May 16, 1960, two young men in their laboratory overlooking the Pacific were bent over their latest creation. The object of their attention was a fist-sized cylinder made of aluminum, from which a few wires protruded and which contained within it a small rod of pure ruby. One of the two engineers turned the voltage up. It all happened at exactly 950 volts. The first laser beam in history shot out of the opening.

The years-long race to develop the first laser (Albert Einstein had described the basic principle as early as 1916) was thus decided. Theodore Maiman, then just 32 years old, had won the race, despite overwhelming competition and doubtful financial backers. It was a milestone in applied physics. But, the public reaction was mixed at best: The first professional journal to which he submitted his invention declined to publish it, while a local newspaper reported his invention as a “science-fiction death ray.”

In the early days, lasers hardly came into use outside of university research laboratories. The early systems had laughably small power; they were insanely complicated and their optics quickly went kaput. The laser was “a solution in search of a problem,” a resigned Maiman said at the time.

Almost 60 years later, it is hard to imagine everyday life without his invention. Hardly any technical innovation has found so many varied applications in such a short period of time as the laser, and the end of development is nowhere in sight. Despite the early estimations of its inventor, there seems to be hardly any problem that the laser cannot contribute to solving: Laser light is used as a measuring probe, as a contactless stylus, as a friction-free cutting tool, and also, for welding metal parts or as a means of transmitting digital information.





SECRET GLITTER

Light makes hidden things visible, even in everyday life. For example, with plants. What is sparkling so seductively here? The blossom of an ordinary cucumber plant, photographed under UV light.

APPEARANCES ARE DECEIVING

In this series, the American photographer Craig Burrows explores UV-induced fluorescence. Seen here: blossoms of the Bradford pear, which smell distinctly unpleasant.



» *Nearly everything we know about the world has been learned through light.* «

THEODOR HÄNSCH, NOBEL LAUREATE IN PHYSICS

“Almost everything that we know about the world has been learned through light,” German quantum physicist and Nobel Prize winner Theodore Hänsch once said. That sounds at first like a slight exaggeration. After all, light is one of the most natural things in the world. It enables all living organisms to see and provides everything with color. Its importance is only perceived when it is absent.

Science did not know what light actually was until well into the modern period. The explanation was first provided by quantum electrodynamics in the early 20th century: Light is neither a particle nor an electromagnetic wave, but instead consists of energy quanta—photons. This is why the science that involves their manipulation is called photonics. The field of photonics develops devices that emit light or that capture light, whether it be a laser scalpel or a highly sensitive camera. The connection is the light, which serves as a tool. In the age of photonics, people use light to bend things into the design they want.

Photonics is known as a key enabling technology, i.e. a technology that is of equal importance to many industries and which makes many other innovations possible—or marketable. There are many historic examples of such key technologies—and in most cases, they have led to a complete revolution in society. They changed the way people worked and lived, bringing forth previously unimaginable products. Technology historians include among them such basic technology cultures as the mastery of fire, printing, or the steam engine. In more recent history, they have included information technology and nanotechnology. Likewise, photonics. The 21st century, certain experts believe, will be based to some extent on the developments of this key technology, as was the case with electronics in the 20th century.

This prediction is borne out by hard facts from the balance sheets and quarterly reports of the photonics industry. The growth rates have been above average for years, with thoroughly positive projections for the future. Profits and employment figures appear to point in only one direction, and it is upwards. The power of innovation is enormous; the companies sometimes invest ten percent of their profits in their development departments.

In the spring of 2019, the industry interest group photonics21.org presented a strategy paper under the headline “Europe’s Age of Light,” which predicted the path of the industry into the 2020s. Even today, European companies account for nearly 70 billion euros of the global industry turnover of 447 billion euros. Given the current annual growth rates of more than six percent, it is realistic that European companies could triple their production performance to over 200 billion euros by 2030.

“There are huge future markets for the industry,” says Jörg Mayer, CEO of Spectaris, a high-tech industry association. “To name a few, there are the topics of Industry 4.0 and smart factories, where many optical sensors, and lots of image capture and processing are required. Even the automotive industry will play a huge role in the photonics industry in terms of autonomous or partially autonomous cars.” The wide use of optical technologies means an advantage for the photonics industry, since it is so largely independent of economic cycles in other industries.

Despite all of this, optical technologies have an image problem in the general public. Most of the time, their work cannot be seen. At first, that sounds paradoxical and may go slightly beyond human imagination.

Ultimately, we believe that anything bearing the name “optical” should also be visible. The classical business models of photonics, moreover, have always been played out within the B2B environment.

For the end consumer, the industry’s activities have always been difficult to comprehend. But the public encounters them almost constantly in everyday life. For example, when a person wants to purchase an energy-saving light bulb at the supermarket. They go to the checkout stand, where a laser camera detects the barcode. Payment is made with a credit card, and fiber optic cables carry the relevant data at approximately two-thirds the speed of light to the servers of the respective bank.

Our fictitious customer leaves the store, whips out a smartphone, and is once again fascinated by the brilliance of the 4K AMOLED screen, on which tens of thousands of pixels are individually controlled on a tiny surface. Perhaps oblivious to their surroundings, they step out into the street, where a car stops at just the right moment because the highly developed camera of the assistance system has recognized the danger.

This banal scene, played out one way or another countless times a day, makes it clear that practically all modern conveniences are more or less based directly on the achievements and breakthroughs of the photonics industry. From smartphones to virtual-reality glasses; from smart homes to home robotics—photonics technologies play a trailblazing role in nearly every key electronic trend. They are also serving the consumer directly to an ever-greater degree. To learn the true potential of photonics, you must take a broad tour of the modern world (see infographic); you have to look at companies in the mobility sector, not omitting the health industry or the aeronautics and space sector,

LASER WORLD OF PHOTONICS

**BRIGHT
FUTURE**

When an industry transforms itself, it also affects its leading trade fair. Laser World of Photonics is well prepared for this

nor the manufacturing industry, nor even a detour into the agricultural industry.

The players in the industry are just as diverse as the fields of application. They are all there, from the typical German SMEs, which dominate the world market as hidden champions in their niche, to the global mega conglomerate with billions in revenue. The Swabian Trumpf Group belongs to the first category. For a long time, the company was a very profitable but conventional manufacturer of machine tools, mostly for sheet metal working.

In the 1980s, Trumpf introduced the first self-developed laser—it was the starting point of an unheard-of success story. Today, the company is among the market and technology leaders in the field of lasers. In brief, they build the devices without which other devices could not be manufactured. The highlight of Trumpf's product portfolio at first glance seems rather unremarkable. The Truprint 5000 is a big gray box with two small windows, which allow a view into the interior, and a large monitor that serves to control it. To the photonics expert, what takes place inside is the logical application of their craft, but to the layperson, it seems like magic. Three laser beams dance over a dark gray surface. Sparks flash. As if from nothing an object emerges.

The concentrated light melts metal, layer by layer, into nearly any three-dimensional object; it forms steel as well as aluminum, titanium, and various alloys. The metals are present in highly pure powder form. A strong laser melts the powder exactly on the spot specified in the CAD data, and binds it to the layer below. In this way, the component is built up additively, layer by layer, with the individual layers sometimes being no thicker than a few micrometers. The excess powder can simply be sucked away later and recycled.

Laser World of Photonics has a long record of success behind it and a bright future in front of it. One who has been on this path for a long time is Martin Lechner, Executive Director of the Business Unit New Technology at Messe München. "Since 1973, the fair has been part of the program and has ever since reflected the entire transformation of the laser industry," he says. For a long time now, lasers and optical technologies have no longer had the purely scientific character that they previously possessed. "The laser today is a universal tool, comparable to a robot that only shows its range of performance within the context of an application," says Lechner.

Photonics: the key to technological progress! The path from research laboratories to everyday use is well-trodden. Autonomous driving, electromobility, life sciences, modern diagnostics, and communications processes: none of these can be implemented without photonics. For companies, this means introducing the next step and going from the specialized laser world to the generalized photonics world. A company that just a few years before perhaps sold lasers only for materials processing today delivers the necessary networking environment together with software and image-supported quality control, thereby becoming a smart factory manufacturer.

Companies will have to confront new business models and find new revenue sources. Diversification offers new opportunities and requires entrepreneurial decision-making. "The trend is headed toward increasing value-added components, i.e. giving the components

more solution space. In this way, the appearance of our fairs will change," Lechner believes. "In Munich as well as Shanghai or in Bangalore, Mumbai, and New Delhi in India, we reflect the entire service spectrum of the industry," says Lechner.

"However, every world region is at a different level of development," Lechner says. While the focus in India is primarily still on production levels, China is a step ahead. There, it is primarily about intelligent sensors and camera systems as trailblazers of digitalization in manufacturing.

"Every year, Laser World of Photonics offers visitors a strong orientation platform together with the parallel electroinca and productronica fairs in Shanghai," explains Lechner. Thus, all relevant content of importance to the industry is found in one place. Trends become clear, innovations take wing, and standards are developed.

As in other industries, digitalization in the world of photonics enables applications to consolidate. New business models arise, which can then lead to new services. "The result of this is a direct impact on the fair, which always reflects the relevant industry."

Thus, the fair itself is transformed from the classical exhibition into a business networking event. "As a fair provider, we take this development into account," says Lechner, "and agree with the exhibiting commercial enterprises and our partners on how we will redesign the next fair event" (you can find additional information in the portrait of Claudia Sixl on page 36).



Martin Lechner,
Executive Director Business
Unit New Technologies at
Messe München

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THE POWER OF LIGHT

Light is the world's oldest resource. It has extraordinary properties: It achieves the highest speed in the universe; it can be focused to the millionth of a millimeter and transmits up to millions of megabits per second. Today, optical technologies are changing industry and everyday life. An overview of the revolution.

IN INDUSTRY 4.0

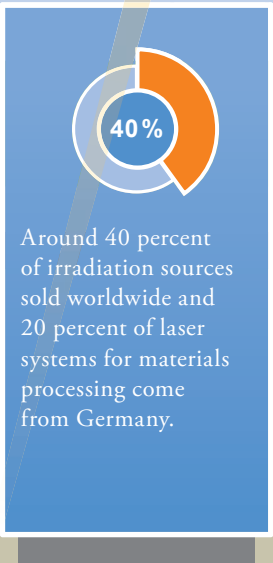
Machines are equipped with cameras and sensors and networked with one another. They transmit information and use it for automatic control.

IN PRODUCTION

Photonic tools and processes are increasingly important in the processing of lightweight structural materials. The goal is their broad introduction into mass production.

THE SUN

Sunlight reaches the earth with a radiation power of 174 petawatts. One petawatt is one billion watts.



IN THE SMART HOUSE

A photovoltaic smart house with solar cells on the roof, heat pumps, battery storage, load management, and an electric car.

IN RESEARCH

The European project Extreme Light Infrastructure (ELI) is intended to achieve a radiation power of 200 petawatts.

IN THE MILITARY

Using DIRCM defense systems, aircraft can recognize and fend off incoming guided missiles.

IN FOOD

In smart farming, harvest times, water quality, contaminants, and soil can be regulated, while LEDs provide the correct light.

IN HOSPITALS

Ophthalmology used strongly bundled light even before the advent of lasers to fuse the retina. Today, photonics is making great progress in minimally invasive surgery.

IN TRAFFIC

Every autonomous vehicle needs optical sensors such as LIDAR (Light Detecting and Ranging).

HIGHEST SPEED

In one second, light travels 299,792,458 meters.



1.5 m
Runner on foot



20 m
Carrier pigeon



250 m
Aircraft



10 km
Apollo rocket



200,000 km
Fiber-optic cable 5 times around the earth



300,000 km
Light in space Distance from Earth to the moon

FALSE COLORS

The amaryllis is also great to look at in the visible spectrum—which makes it a favorite ornamental flower. You normally see its flower petals shimmering red.



»

3-D printers are becoming established in industry to the same extent that paper printers are used in private households today.

«

FRANK PETER WÜST, TRUMPF

This process is called selective laser melting, but is also often referred to as metallic 3-D printing. Trumpf has been involved in research on this technology since 1999, together with the Fraunhofer Institute for Laser Technology in Aachen (see interview, page 16). There are many advantages in comparison to conventional methods such as casting or milling: There is no metal abrasion in the layer construction process, and only the metal that is needed for the component is used. In addition, no molds need to be prepared in advance. Production is therefore more efficient and flexible. Additive manufacturing is overtaking one industry after another: It allows individual dental crowns to be created, forms orthopedic implants, and creates industrial tools, and complex, lightweight automobile parts. With the help of a new green laser, precious metals such as gold or copper can be worked on, allowing for jewelry pieces to be printed.

Although laser melting was until recently used primarily for the production of prototypes, today the process can be used for mass production. “3-D printers are becoming established in industry to the same extent that paper printers are used in private households today,” says Frank Peter Wüst, Director of Materials, Applications, and Consulting at Trumpf.

By 2030, the company intends to generate revenues of half a billion euros in this segment. Additive production processes allow for more complex and lighter structures, which nevertheless are enormously stable while being particularly suited to use in air transport, for example in the manufacture of engine blades. According to one study from the market research firm Technavio, the use of additive production processes will

grow by more than a quarter annually in the coming years. “Photonics is disruptive,” says Peter Leibinger, CTO of Trumpf, summing it all up.

The disruptive power of photonics can also be seen in other industries. For example, a modern car would hardly be imaginable without photonic innovation—and it is putting manufacturers and their business models under pressure. Steerable laser headlights reaching several hundred meters, which adjust to the direction of the road and which automatically dim for oncoming traffic, or lasers that project route and traffic information onto the windshield, are the easy part.

In order to realize its vision of autonomous driving, the automobile industry needs technologies that can very quickly gather information about the environment over long distances and under adverse external conditions. Besides high-performance stereo cameras that give the automobile, so to speak, spatial vision, lidar (light direction and ranging) is one of the most important sensory tools of a self-driving car of the future. Similar to radar, the lidar system emits laser impulses and, based on the spectral color of the light reflected from the surroundings, measures the speed and distance of the other traffic. The laser scanner provides an accurate image of the surroundings in detail up to 25 times per second. This information is then transformed by the onboard computer into the appropriate control commands.

Up till now, lidar systems have operated using a rotating mirror, which steers the laser beams and thus illuminates the field of view. That made them not only relatively expensive, but also susceptible to interference. Newer versions rely on liquid crystal metasurfaces and operate without mechanically moving parts. In

this way, the system is intended to operate more reliably and have a longer lifespan compared to the competition. “Due to the fact that it involves only one chip, the system is also much more cost efficient,” explains Luc Van den Hove, President and CEO of the Imec research institute, where a similar technology is under development. “This is critical prerequisite for putting lidar in all automobiles.”

However, it is not only inanimate materials that can be manipulated with lasers. In the field known as biophotonics, optical technologies are being employed in both the diagnosis and treatment of illnesses. Even the inventor of lasers mentioned in the introduction, Theodore Maiman, suspected that the technology could one day be useful in medicine. He himself experimented on rats. One could possibly even concentrate the laser light “on a single blood cell.” But, until that comes about, there is “still a way to go,” according to Maiman at the time.

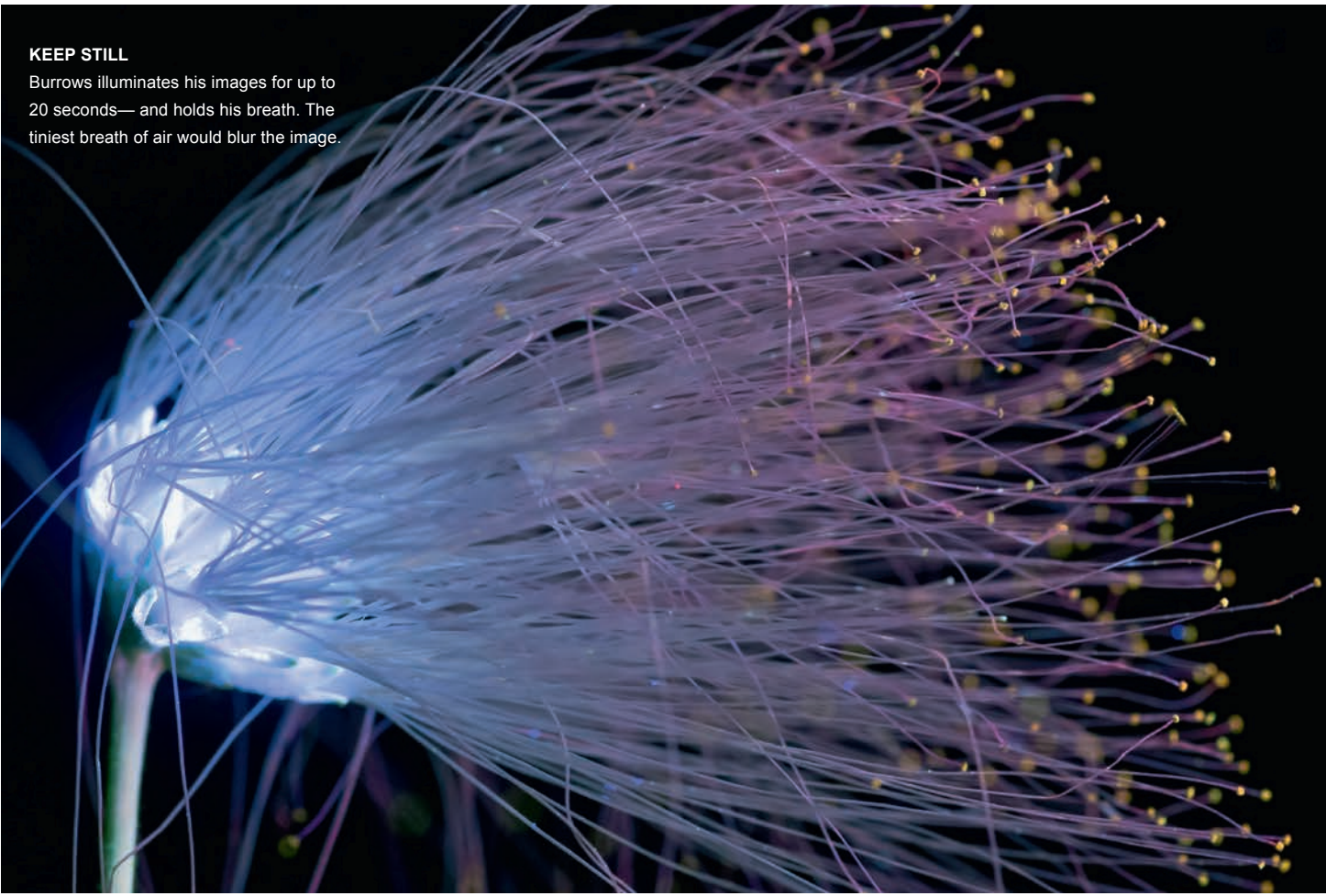
However, things moved faster than expected. Just ten years later, experimental physicist Arthur Ashkin was working on the optical tweezer. Viruses, bacteria, and other living cells can be held in place or moved by laser light, without being destroyed. In the 1980s, Donna Strickland and Gérard Mourou developed the chirped pulse amplification technique, in which ultra-short laser pulses are produced with simultaneously extremely high power. Millions of shortsighted people profit from this breakthrough in the form of the LASIK method, in which irregularities in the cornea of the eye are removed using a laser scalpel. Last year, the three laser researchers received the Nobel Prize in Physics for their work.

Regardless of whether in medical practice or in the factory, the computer systems

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KEEP STILL

Burrows illuminates his images for up to 20 seconds—and holds his breath. The tiniest breath of air would blur the image.



PERFECT WAVES

Burrows uses UV LEDs with a wavelength of 365 nm for his work. Shown here: a gaillardia flower, which is just opening.



INTERVIEW

“THE LASER IS NOT YET FULLY DEVELOPED”

New wavelengths, more power, more materials, better processes—
ILT expert Dr. Arnold Gillner on the present and the future of laser research



ARNOLD GILLNER
is Director of Abrasion and Fusion at the Fraunhofer Institute for Laser Technology (ILT) in Aachen, Germany

MM | ILT has carried out cutting-edge research in laser technology for more than 30 years. What questions are your institute tackling at the moment?

ARNOLD GILLNER | A big theme currently is definitely high performance ultrashort pulse laser technology. We are developing picosecond and femtosecond lasers in the multi-kilowatt class. This hasn't been done until now. But we are concerned not only with breakthrough technologies, but also with the optimization of existing processes. Digitization is an important enabler in this respect, and helps us to better understand processes and to adjust them for specific applications. The laser is a digital tool; during manufacturing, we generate a lot of data, which we process using AI methods and thus can improve processes. Another field is the further development of additive manufacturing with respect to new materials, such as copper or ceramic.

The laser is the multi-tool of the present. Will the technology be fully appreciated by the public?

The only thing that is really well-known is actually laser eye surgery. This is due to the fact that most fields where lasers are used are invisible to consumers. It is very difficult to communicate to people that more than one hundred laser applications are required before they can pick up their smartphone, or that automobiles are welded using lasers or that injectors are drilled using lasers.

What role do lasers play in megatrends such as Industry 4.0?

They are the perfect complement because they are a digital tool that you can change with programming, regardless of how the component is manufactured. To that extent, lasers can be integrated into Industry 4.0 environments spectacularly well, espe-

cially when it comes to individualization of production.

The laser industry has grown disproportionately for years—what will happen in the future?

We have seen double-digit growth for a long time now. But there are naturally highs and lows. I always have the impression that you should invest in modern technologies during economically weak phases, in order to better maintain a market position. And that brings us back to the laser, from which new growth is developed.

What role does the German laser industry play internationally?

Certainly a leading one. We have the BMBF to thank for this, as laser research was significantly supported for many years through long-term development programs. This provided a feeding ground for the growth of the photonics industry in which companies profited, many large institutes were established, and Germany took a leading role in industrial laser technology. Unfortunately, the topic has recently faded somewhat from the spotlight in terms of government support. The trend now is rather toward quantum technology—a market that doesn't even exist yet. It is the same at the European level. But there are still many things that can be done. Laser technology is nowhere near reaching the limit of its potential.

One of these topics is a new generation of ultra short pulse lasers—what makes this technology so exciting?

On the one hand, it allows the processing of any material because the intensities produced are so high that you can cut or remove anything, whether diamond or biological materials. Plus, it allows you to overcome certain barriers that have been around since work with lasers began, for example

in relation to its ability to be focused. A further point is that the pulses are so short in time that the interaction time between laser pulse and the material to be abraded is negligibly small. This allows us to achieve significantly more accurate processing without thermal stresses on the component, as well as the processing of new materials such as carbon fiber composite objects, ceramics, or high-strength steels.

Keyword: additive manufacturing—is the technology far enough along for industrial mass production yet?

Absolutely. Perhaps not in the millions of pieces range, but there are products that can be produced economically. The trend is nevertheless strongly heading toward individualized products; this is what we are seeing. We are no longer mass producing, but producing to order, and in a customer-specific manner. That is also played out in spare parts management. We are also dealing with the topic of process parallelization. In this case, there is no longer just a single laser beam in use, but hundreds or thousands simultaneously—and productivity increases with each source.

The laser will be 60 years old in 2020—what applications and breakthroughs are imaginable in the future?

We can already see a trend toward diode lasers with greater beam quality, so that we will soon no longer need diode-pumped solid body lasers or CO₂ lasers. The systems will become more simplified; we will move away from optomechanical structures and in the end have only the laser itself, with which you can do everything. Also, the colors will change as the spectrum is opened significantly to other wavelengths. UKP lasers will be developed into multi-kilowatt systems, which will perhaps supersede laser-cutting technology. One could say: The laser will become more universal, higher quality, and cheaper. ■



DECEPTIVE

The spherical flowers and the harmless-sounding name of the white-headed mimosa are deceptive. It is actually an invasive plant that displaces other species.



PIXIE DUST

A pair of Johnny jump-ups, also known as heartsease. The glittering particles on the flower on the right are pollen.



GOLDEN MOUTH

A flower otherwise found in domestic vases and not under UV light: the narcissus. Burrows himself became a flower lover during his work—he primarily collects orchids.

The mechanisms of photonics permeate the entire industrial value chain. From production to quality control, one application leads to the next.

that keep the modern world running need the most accurate information possible about this world. Photonic systems provide the necessary eyes and sensory organs. Their sensors form the fundamental basis of all applications.

Stemmer Imaging is one of the market leaders in the area. The image-processing specialist from the Munich area had a successful initial public offering just this past year. Peter Keppler is the Director of Global Sales. He says: "In my view, those involved in automation must deal more and more with the topic of image processing, since without this technology, in many cases they will no longer be able to meet the requirements of Industry 4.0 in the future."

In the smart factories of the future, hundreds or thousands of component parts must be inspected for deviations in the micrometer range; conveyor belts move at 30 meters per second or more—the naked human eye is simply no longer the measure of things here. However, the cameras used in industrial image processing have very little to do with the devices the end consumer uses to film their vacation highlights.

Approaches such as hyperspectral imaging allow the chemical composition of a material to be determined via analysis of its light absorption—entirely without destroying the sample in the process. In this way, products such as easily damaged foods can already be analyzed in their packaging. Other industries are also benefitting from contactless testing. For example, the pharmaceutical industry. Instead of simply taking random samples for quality assurance, a 100 percent inspection in ongoing operations can be guaranteed. It is not just the hardware that is critical to the exact measurement and analysis, but also the corresponding software. Ultimately, the images must not only be taken, but also pro-

cessed. The progress achieved in recent years in the area of machine learning and artificial intelligence has led to the situation in which even the smallest quality deviations can be counteracted, such that no production errors whatsoever arise. According to Peter Keppler, "thanks to the excitement that has sprung up around the concept of deep learning in recent years, the use of this technology for image processing has now become popular on a broader basis."

The mechanisms of photonics thus permeate the entire industrial value chain. The obvious aspect of optical technology is, at least at first glance, also the most spectacular. Huge displays with stable viewing angles illuminate the inner cities of the world, while light artists use laser beams to create holographic dream landscapes of shining particles in the air. Mini-drones equipped with LEDs are turned into electric glowworms and, in factories converted into urban farms, special UV diodes make vegetables sprout like the proverbial bad weed. Using targeted illumination, the operators can even control the flavor and nutrient content of the plants.

And, of course, there is still the essential property of light: It is bright. Light emitting diodes have also left a dramatic transformation in their wake in terms of efficiency and performance. Just a few years ago, we weren't even sure whether a light emitting diode could ever achieve the brightness of a light bulb. Today, nearly 20 percent of worldwide power consumption is attributable to illumination systems of all types. LEDs and other efficient and contemporary lighting technologies thus carry enormous potential: According to a study by the US Energy Department, the global conversion to LED illumination would save 800 million tons of CO₂. That corresponds to the output

of nearly 700 coal-fired power plants, which could be saved. Per year. "The modernization of illumination is a decisive key for the reduction of worldwide energy usage," says Karsten Vierke, CEO DACH (Germany, Austria, and Switzerland) of lighting manufacturer Signify.

For anyone involved in photonics, the future is always happening in the present a little bit. Just as one can expect from a key technology photonics is currently providing a new upswing in the weakening semiconductor industry. One example is EUV lithography, in which the semiconductor is exposed to extreme ultraviolet rays, which enables smaller and more efficient circuits.

Computer chips are thus made more powerful. Lasers operate with a very short wavelength of 13.5 nanometers and so can print ultra complex structures on the silicon wafer. The first chips using this technology will be delivered later this year. They ensure that the famed Moore's Law will continue to apply for a few more years. Should the era of silicon-based computers nevertheless come to an end, it will probably be lasers that manipulate the individual atoms in quantum computers.

How will photonics develop? "That's like asking in the 18th century how electricity would develop. No one could have answered that," says Reinhart Poprawe, Director of the Fraunhofer ILT. What is certain is that the industry still holds unimaginable possibilities. Even Albert Einstein knew that not all of light's secrets had been uncovered. "As he once wrote: 'All the 50 years of conscious brooding have brought me no closer to answering the question, 'What are light quanta?' Of course today every rascal thinks he knows the answer, but he is deluding himself..." ■

HOW CAN THEY DARE TO?

INTERVIEW: KATARINA BARIC AND STEFAN TILLMANN
PHOTOS: ROBERT BREMBECK



One regularly puts his fortune at risk as part of his job. The other risks his neck in daring expeditions. We spoke with investor Benedict Rodenstock and climbing legend Stefan Glowacz about risk

MM | Mr. Glowacz, the Oscar-premiered documentary film *Free Solo* attracted many visitors to the theaters. What do you feel when you see such images?

GLOWACZ | Incomprehension, actually. I also have climbed without a rope before. But in hindsight, I think that arrogance and presumptuousness were a privilege of youth. That's what you do in your "Sturm und Drang" period. When you feel immortal, you no longer think about what the consequences might be. You are unrestricted. You are free. I also have to say that soloing is naturally the purest form of climbing. It brings you into a state that you can maybe only reach through meditation. It is a deep interplay between body and spirit.

MM | It sounds fascinating.

GLOWACZ | It is, too. When you are hanging on only two holds, you look between your feet and see a gaping emptiness. At that moment, you get the feeling that you have death under control. That you decide what is safe for you. Without knowing if the next hold could break away. This point of view ultimately became my undoing. During a training tour,

I lost my grip at about eight or nine meters' height and plummeted back to the ground. I seriously injured myself. It ended my career as a solo climber. That was an important shot across the bow. Were it not for that, I would have continued on and would eventually have had a really big fall and been unable to get up again.

MM | Everyone in the scene is aware of this danger, right?

GLOWACZ | Everyone actually knows this: The more often you do it, the higher the likelihood that it will be your last time.

MM | Today, you primarily undertake expeditions, for example most recently to Greenland. You were looking for new limits: your own, but also civilization's. How is that riskier than a climbing tour?

GLOWACZ | We're not actually seeking risk in that sense. The fascination with such undertakings consists in recognizing the risk and eliminating it as far as possible, even in the planning phase. In this way, we head out completely differently from Shackleton and Amundsen, who at the time were really



venturing into the unknown. The world today is more or less discovered. And with Google Earth, you can zoom into any region of this planet. What it is actually like at that location, however, is a different story.

MM | How is it for you, Mr. Rodenstock? Could you imagine such an expedition? You yourself go on ski, climbing, and mountaineering expeditions. Where are your personal limits?

RODENSTOCK | In the past, I also took part in some interesting tours. For example the Haute Route, which is the mother of all ski tours in the western Alps. You spend ten days on it between elevations of 2,000 and 4,000 meters and are on the move for eight to ten hours per day. If you fail to reach the next hut, you have to dig a snow cave, because there is no chance of finding shelter anywhere else. It is therefore important to be fit. Plus, you need to have self-confidence.

MM | And were you always confident in every situation? Recently, some people actually had fatal accidents on the Haute Route.

RODENSTOCK | You cover long distances. You go a total of 200 kilometers, and there are long, relatively flat stretches over glaciers. It always gets complicated when you go from one valley into the next. You usually have to go over a pass, and there are generally rather steep passages. That takes you to the limits relatively quickly. There is a key point on the

Haute Route where you have to abseil roughly 50 meters. I definitely used up my adrenaline for the day there.

MM | Did you consciously seek out the risk?

RODENSTOCK | I believe that it always comes with mountain sports; the thrill is part

of it. And naturally, you also want to climb. Plus, there is always an inherent risk in alpine sports. These are the alpine risks: bad weather, fog you can get lost in, avalanches, or rock-falls. As an individual, you cannot influence these. That's why I go on fewer ski tours these days. Among other things, it is a tribute to



THE PIONEER

Stefan Glowacz, 54, is the trailblazer of the German climbing scene. He won his first competitions at the end of the 1980s, before dedicating himself to “big walls” in remote locations. Today, he undertakes sustainable, CO₂-free expeditions. He recently trekked across Greenland, where he traveled with electric vehicles and a sailboat. Glowacz is married to his second wife and is the father of triplets.

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I consciously throw myself into situations in which I feel that I am just nature's plaything.
 «

STEFAN GLOWACZ

my family. Plus, I don't have as much time anymore. And I have enough excitement in my profession now. For me, it's okay if I just ski normally.

MM | Is it more of a contemplative experience for you, with the beauty of the mountains, or do you specifically seek adrenaline?

GLOWACZ | Of course, it also involves being in harmony with nature. That's why you go mountain climbing. Otherwise, you could just do indoor sports. It has to do with experiencing the beauty of nature, its primitiveness, and also its power. I consciously throw myself into situations in which I feel that I am just nature's plaything.

RODENSTOCK | That is how I see it, too.

It's all about the wildness of nature. And, on the other hand, your own humility. It's because you recognize that you are just so small in this environment.

MM | Then do you believe that humans have a need for risk?

RODENSTOCK | I believe it is an inherent part of the world that there are also dangers. It has always been that way.

GLOWACZ | I think that it simply depends on the person. There are many people who only begin to feel alive when they are faced with certain dangers. Then they live more intensely, or at least they believe they do. That is certainly one of my motivations for always breaking out of society. Not that I cannot tolerate society. But I enjoy reducing things to the absolute necessities from time to time. First of all, it highlights to me the wealthy and secure environment we live in. Above all, I do not want to miss out on the awareness of how little a person needs to be happy. And when you're on an expedition, that means a safe campsite, a hot meal in the evening, and a dry sleeping bag. Then, you are the happiest person on earth.

MM | You once said that curiosity is a great motivation. Is it a kind of physical curiosity to want to sound out your own limits?

GLOWACZ | There is an enormous difference in consuming adventures that others have had and the sense of having experienced it on your own, having worked it out and

suffered it for yourself. It's the same for an entrepreneur, isn't it?

RODENSTOCK | I also get nothing handed to me. It is also a long trek, uphill, so to speak.

MM | Isn't it somewhat infantile to enter into risks? Or is it a grown-up desire? Children actually don't consciously take risks.

RODENSTOCK | I believe children don't yet understand the concept of risk in that sense. And, they maybe also don't know how dangerous many things are. That's what we parents are there for. By warning them not to touch a hot stove or not to fall from a chair, we seek to protect them. But, children also have to experience many things for themselves.

GLOWACZ | Absolutely. Sometimes, I see young parents hovering over their children like helicopters trying to keep them away from every risk. I think that is the wrong approach. Children must have their space.

MM | Seen from an economic point of view, risk is actually a must. Without it, there would be no innovation, no growth. Mr. Glowacz, you have developed a climbing brand called Red Chili. Is it easier to risk money than your life?

GLOWACZ | Both can be negligent. When we founded Red Chili, we already knew with relative certainty what we were doing. We knew the material by heart, and the market for climbing shoes was straightforward. We



THE INVESTOR

Benedict Rodenstock, 48, is the great grandson of Josef Rodenstock, who founded the Rodenstock eyewear company. He studied in Bologna, New York, and St. Gallen, and worked as a corporate consultant before founding the venture capital firm Astutia in 2006. Successful exits include, for example, Amorelie and Fashionette. Rodenstock is married and has a son.

»
*If you invest in ten
 companies, you
 have to reckon with
 the fact that two will
 fail, two will go
 through the roof, and
 the rest will end up
 somewhere in
 between.*
 «

BENEDICT RODENSTOCK



were successful—up to the point at which we could no longer finance it ourselves because we had become so successful so quickly. But I must honestly say: There is always just as much to be said against starting a business as there is for starting it. And, I think, when you have studied for an MBA, you find more reasons to argue against it. As founder, you need a certain naivety to have the courage to say: We're doing it now!

MM | Do you see it that way too, Mr. Rodenstock?

RODENSTOCK | Yes. Although, it's always easier said than done, too. Sometimes, you just have to make decisions and take certain steps. I believe that, as an entrepreneur, you have to be just a little bit crazy. Sometimes, it's better if you don't know ahead of time what's coming at you. Otherwise, you prob-

ably would never have done a lot of things. Entrepreneurship is necessarily bound up with risk. These days, we have a developed national economy in which, in principle, only incremental growth takes place. For me, that's no longer real entrepreneurship. With my firm, I work instead in a field where businesses are built up from nothing.

MM | Mr. Glowacz, can you imagine investing in start-ups? Or how do you deal with your savings: the stock market or under your pillow?

GLOWACZ | Well, it's so little that I don't even have to think about it (laughs). However, I would not do anything that I didn't understand, or with which I had no affinity. It also makes a huge difference whether I am risking my own money as an entrepreneur or if I'm using someone else's money as a manager.

But, I must honestly say that I cannot stand to lose money. When I invest somewhere, I have to know with 70 percent certainty that it will work. That would likely be real estate, which I develop.

MM | But real estate is more risky than traditional savings.

GLOWACZ | Yes, but I only buy in an area that I am familiar with. For example, I have a hotel in Garmisch, in Grainau, that I am developing and expanding by adding another building. Whether or not the investment is successful is totally within my own hands. And, I always have the option of selling it.

MM | Does that make sense to you, Mr. Rodenstock? How high does the level of certainty have to be for you?

RODENSTOCK | Yes, that makes sense to

me. I have been an investor now for 13 years and have experienced some success stories that we wrapped up with a profit. But, naturally, there were also a few times when nothing came of it and the money disappeared completely. But that's also part of the business. If you invest in ten companies, you have to reckon with the fact that two will fail, two will go through the roof, and the rest will end up somewhere in between. And the two that really go well must then make up for all the others. So, it makes no sense to invest in just one or two start-ups and then hope that something comes of it. The risk then is just too great.

MM | So you manage your risk similarly to a well-diversified stock portfolio?

RODENSTOCK | Exactly. Although a total loss in a stock investment is a rare occurrence. If I lose 20 percent in stocks, I can still sell them off. If I have doubts about a start-up, I can't get out so easily. It's more complicated than getting a divorce (laughs).

MM | As the offspring of the Rodenstock Company, you undoubtedly grew up without financial worries. Have you ever had the need to enter into risk?

RODENSTOCK | I always wanted to do something on my own, perhaps also because of my family background. I was previously also never credible as an employee. Today, I have complete responsibility: I have to run the whole enterprise, pay my employees, and support my family.

GLOWACZ | Is it harder to get something of your own off the ground when you come from such a dynasty?

RODENSTOCK | The expectations are higher, yes. Everyone basically expects that you will also become a great entrepreneur. But that is a lot harder today, just because of the huge competition. It's no longer as easy as it was after the war to build something up quickly.

MM | How do you specifically go about making your investments?

RODENSTOCK | We receive approximately 1,000 tenders per year. For each of them, we have to precisely examine the business model, perhaps also the contracts and shareholder structure. It's a total package, in which as many factors as possible should add up. The most important one is the people—that they

can carry out what they have set out to do as a team. And that we can get along with them well. That also includes letting them have their say. We normally also do not invest only in an idea or a business plan. There must at least be a prototype, a proof of concept, and initial sales.

MM | Is calculating risk then a matter of the head or the heart?

RODENSTOCK | A bit of both. I believe that with experience, it comes more from a gut feeling, but I think you must also go through the risks intellectually.

GLOWACZ | It always comes down to how you grow into it. I started mountain climbing because my parents simply took me along, even when I could barely walk. I learned so much during this period. And you develop instincts that you can no longer learn if you start at 20, 25 years old. For example, I look at the sky and know exactly when I need to shorten a tour because there will definitely be a storm in the afternoon. You feel that. It's exactly the same with entrepreneurship. If someone had founded a student newspaper while they were still in grade school or founded a playground service, they would naturally have a different understanding of entrepreneurship than someone who, some time after graduation, imagines setting up a business.

MM | What you both have in common is independence—the one in entrepreneurship, the other in sports.

GLOWACZ | Yes, certainly. Of course, there's something to that if you are responsible for every single decision. But passion comes before that: that you are fired up by your idea, that you are absolutely convinced about it. I believe that you can only survive today if you bring one hundred percent passion to every day. As an athlete or even as an entrepreneur, you no longer have a nine-to-five job. When we wanted to found Red Chili, I was busy with it from morning to night. I got up during the night and wrote my ideas down in a little booklet. Or I called my buddy, my business partner, immediately and told him about them.

MM | How do you see your responsibility toward your family?

GLOWACZ | I weigh every risk very carefully, and my family knows that. I am now very cautious. There are many mountains in the

Himalayas, for example, that I only marvel at from below. Many walls that have yet to be scaled—and there are good reasons for that. Because there are only two ways this can end: Either you manage it and you are the great hero, or you fail and are the greatest idiot because everyone knew from the start that it was too difficult. My family knows that I am very careful these days. And that I would rather turn back than take an uncalculated risk.

MM | How do you teach your child about handling risk, Mr. Rodenstock?

RODENSTOCK | Well, my son is now five years old (laughs). We will have plenty of time for that. That is not an issue right now. But at some point, we will introduce him to it, when the time comes.

MM | What would you think if your children wanted to take a similar path to you, Mr. Glowacz?

GLOWACZ | I have tried that already. My life now revolves almost 24 hours a day around climbing and mountaineering. And, it is relatively unlikely that my own children would feel a similar fascination with it. So, I have very carefully tried to introduce them to climbing. But it did not interest them at all. My boys are enthusiastic freestyle skiers—a breakneck kind of sport. I was once at a competition where my son had a big fall. That is unbearable for a father. Since then, I would rather stay at home and hope that I don't get a call from the hospital. ■



SUMMIT IN WERK3

Editors Stefan Tillmann and Katarina Baric met Benedict Rodenstock and Stefan Glowacz for an interview in Werk3-Fotostudio in Munich-Sendling. First question: Who wants to climb the rope?

THE SECURITY CHAMPIONS

BY MICHAEL MOORSTEDT



Everyone talks about hacks and data leaks. But who is in charge of the security of companies? Visit the secret heroes of the German economy.

When Sascha Herzog and Jürgen Pfister talk about their work, the stories often sound like episodes from a detective novel. Like the time they were working in Switzerland. The target was a computer belonging to the CFO of a well-known private bank. Herzog and his team contacted his assistant, posing as the head of IT using a falsified text message and set an appointment to allegedly install new software on the laptop containing the valuable data. A colleague was already on site and used a falsified visiting card to identify himself as a representative of the antivirus producer. Within an hour, he was seated at the computer. Since the trojan horse could not be loaded on a USB stick, they just quickly sent it by email. Then, they had full access to all of the contact data. All of this happened while the woman trustingly made a coffee in the next room.

Today, hardly a week goes by without news of a spectacular hacker attack. Customer data and company secrets are sometimes not at all, or only poorly, secured on the Internet, while email addresses and passwords are leaked millions of times. According to a study from the IT-security company McAfee, the worldwide economic damages from cyber-

crime amount to 600 billion USD every year. Nearly 70 percent of companies and institutions in Germany have been the victims of cyberattacks in recent years, as a survey from the Federal Office for Information Security (BSI) has shown. In nearly half of the cases, for example, the attackers were successful and could gain access to IT systems, influence their functionality, or manipulate the companies' websites. Every second successful attack led to loss of production or business breakdowns.

Firms like Nside Attack Logic are here to prevent this. Companies hire them to break into their networks. They are supposed to find out where the weak spots are. "We simulate complex attacks with a clear target," Herzog explains. Every hacker has a motive: To enrich themselves, sabotage the competition, or strategically control critical infrastructures.

The company is headquartered in a modern office complex in the north of Munich. There is a lot of glass and steel, with open coffee kitchens and a foosball table in the foyer; a visitor can see into most of the offices. Herzog sits in a conference room and tells about successful attacks and companies that went bankrupt thanks to ransomware.

IN THE SPOTLIGHT

Jürgen Pfister knows that IT security has long since become the CEO's business.

Photo: Luise Aertner



A few rays of filtered sunlight fall into the room through a not-quite-closed shade. With closely cropped hair, neatly trimmed beard, and broad shoulders, he does not exactly look like the popular stereotype of a hacker found in the media.

“Of course we cannot name names,” says Jürgen Pfister, Herzog’s co-CEO. Cybersecurity is a confidential business. The firm, which has barely more than 20 employees, counts as many as nine Dax-listed companies among its customers. These include banks and insurance companies, energy suppliers or companies from the pharma and chemical industries. All sectors that are highly vulnerable. “Our work consists of going through attacks on the critical business processes of our customers, using nearly all of the means that are also used by cybercriminals and other actors in this field,” says Pfister.

The questions are: Which attacks are possible? How do those accountable respond? Do they even notice the attack at all and what actions are in place to block an attack already in progress? The watchword is cyber resilience. Using a coordinated strategy, critical business operations are maintained, IT is restored quickly after an attack, and the effects on business are minimized. “We help our customers to maximally improve their ability to resist,” says Pfister. “Besides technology, this also involves organizational measures and the awareness of employees and partners.”

At the beginning of each hack is what Sascha Herzog and his team call “tactical information gathering”: “We observe a company through the lens of a hacker on the Internet, do research in databanks, and correlate information that would go into a potential attack.”

In this phase, not even a single network packet is sent against their customer's servers yet. How else would you carry out an attack yourself, when the companies themselves often open the doors for the hackers?

One favorite method consists of so-called social engineering and spearphishing. Herzog's employees go for the target. They inform themselves about the current procedures in the company and create psychological profiles of the target persons. Sometimes, they present themselves as a hopeful applicant sending in their portfolio as an attachment, then again as a student working on their bachelor's thesis who is just quickly asking the experts if they can verify test results.

The industry is full of stories like these, and almost every time, there is a trusting employee at the company who falls into the trap. Usually, the contact is made with employees far from the IT department who believe that the complex material doesn't have anything to do with them anyway, such as salespeople and marketing experts; not even the janitor's computer is safe. Cybersecurity is not only the task of the specialists, but applies to the decision-makers in the company as well. For reasons such as these, Messe München held Command Control for the first time in the fall of 2018 (see box), which is a summit rather than a fair.

Of course, it is not just humans who are prone to errors. Technology is, too. More and more devices are connected to the Internet. For example, in their work, the experts from Munich make use of the search engine shodan.io, which lists the IP addresses of countless networked devices: Printers, routers, and even control systems for power plants or water treatment plants. What this means is: Once you have tapped the relevant address, you can manipulate the corresponding hardware with the necessary know-how.

"Imagine the typical mid-size company," says Herzog, "say in the manufacturing industry. What happens when a competitor takes over its system controls and drills heads into the workpieces, so that the devices no longer function and production comes to a standstill?"



IN VIEW

Sascha Herzog has worked in IT security for 15 years, looking for security holes on behalf of companies.

In the worst case, it can take up to half a year until spare parts can be delivered. You might as well close the shop."

Good hackers, of course, do not break anything. Instead, they try to reach the place where they can launch such an attack. In their own hardware laboratory, they analyze devices to find their weak spots. They recently found a critical error in the routers of a major German telecommunications provider. A potential point of entry into millions of households. The bug was fixed in collaboration with the company.

Both tiny webcams and powerful industrial drills are affected to the same degree. "When you look under the hood, what you find is often insanely trivial," says Herzog. Industry 4.0 teems with unsecured systems and standard passwords that are freely accessible on the Internet. Many weak spots that you find in the area of networked devices are perhaps no longer valuable to a hacker," says Herzog. But he could already be strategically positioned and waiting for the right moment—then the attack begins. ■

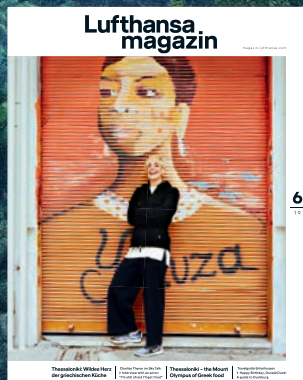
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Command Control addresses all decision-makers who participate in the digitalization of a company or an organization. Therefore, the event has an international focus and is designed to be a dialog platform for all of Europe. Command Control is distinguished by its interactive character, offering participants numerous continuing-education and networking opportunities. Key leaders from commerce, science, and politics deliver the necessary know-how and the right contacts to manage the digital transformation of a company through best-practices workshops, peer-to-peer sessions, panel discussions, and keynote addresses. The theme of the event in March 2020 is Cyber Resilience. www.cmdctrl.com

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IN THE TRADE FAIR HALL

THE GLASS

The 72 light domes can be dimmed by the hall attendant with the push of a button—for example, when exhibitors want to avoid a glare. They also serve as a smoke evacuation system in case of fire.

THE GATES

The ten gates are five by five meters, meaning that standard trucks can drive through them. They also have integrated doors for personnel.

THE NICHES

The storage space for the partition is 18 square meters and offers space for 40 separating elements.

THE HEIGHT

8.95 meters to the partition bulkhead below the red C6 sign, 11.55 meters to the rod above the red sign.

THE PARTITION

The partition comprises 180 running meters. It consists of 150 elements, each weighing 500 kilograms.

These can be used to divide up the hall: into two spaces 1,250 square meters each, or one space of 2,500 square meters.



Here in our new column, Micro, we will show what holds the economy together at its core. A production mechanism, a raw material in demand, or a detail from the trade fair industry. We begin with trade fair hall C6, which we opened in Munich, together with its neighbor, C5, on December 13, 2018, and which contains some very special features.



THE ROOF

The roof support structure consists of 1,800 tons of steel and has a span of 63 meters. The load carrying capacity is 25 kilograms per square meter.

THE AIR

Partial air conditioning is carried out by 48 air outlets. This corresponds to an air mass of 360,000 cubic meters per hour.

THE CHANNELS

There are 24 division channels, each running transversely through the hall. They provide water and wastewater connections, Internet, compressed air, and supply power to the exhibitors.

THE TECHNICAL CORRIDORS

The hall has no basement. Therefore, two technical corridors run underground, each seven meters wide.

THE LOAD

The floor has a load capacity of 5 tons per square meter. That means it can support a heavy-duty truck with a 60-ton load. There is also a smaller forklift at 16 tons, which carries a greater load.

THE FLOOR

The poured asphalt is five centimeters deep and stretches over 10,000 square meters.

»WHEREVER THERE IS CHAOS, *THERE IS* OPPORTUNITY«

BY VICKI SUSSENS | PHOTO: VISHAL BHANUSHALI



To stay on your toes in India's rapidly evolving trade fair industry, you need a can-do attitude, says Bhupinder Singh, head of Messe Muenchen India.

MM | India is going through its biggest economic renewal ever. What's your response to that?

BHUPINDER SINGH | It's bullish! We grew by over 47 percent in 2018. We're currently almost four times the size we were in 2013/14, and since then we've moved from being the sixth-biggest international exhibition firm to third place. In the last six years, we've acquired four new exhibitions and are continuing this acquisition drive to become the leading player. In all the major criteria—visitors, exhibitors, and floor space—we've expanded significantly.

MM | Fueled by Mr. Modi's Make in India, Digital India, and other economic initiatives?

SINGH | Yes, we're playing a big role in helping foreign investors to learn about the market and deal with its infrastructure and other challenges. Mr. Modi is focusing on boosting 25 sectors and we're active in 14 of them. But there are other factors, such as India's rising consumer demand from a growing middle class, and the fact that India is developing world-class industries, such as pharma and IT.

MM | How established is the trade fair sector in India?

BHUPINDER SINGH is the CEO of Messe Muenchen India, which he joined in 2007 as a senior project manager.



SINGH | It's a rapidly evolving sector so it is a fairly disorganized space. I still have to explain to my friends what my work is all about! But in the last 15 years, we've made considerable progress.

MM | So it's a pioneering sector?

SINGH | That's what makes it exciting. Wherever there is chaos, there is opportunity. We are seeing a lot of entrepreneurship, with exhibition firms scaling up their businesses, many start-ups—some really good—and the industry is also stimulating local associated businesses. All this means a rapidly changing

marketplace. You can't work in it without a can-do attitude because you need to stay abreast of fast-moving trends.

MM | What are hot markets?

SINGH | In 2018, Bauma Conexpo India scaled new heights with 700 exhibitors and almost 40,000 participants. Why? Through Make in India, the government is investing heavily in infrastructure and all the big global construction equipment players are involved. Digital India is attracting huge investments from mobile manufacturers. Samsung, for example, opened its biggest

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I'm a big fan of letting the staff step out of the office to tank up because office walls can kill the creative spirit.
«

»
*We keep our ears
 close to the ground,
 and the sound that
 comes from it is
 always better than
 any market research.*
 «

plant in Delhi last year. This has seen electronics India become the country's largest electronics trade show. Drink technology India is booming because of growing demand for drinks among middle-class Indian youth. Our fair for analytical instruments show for the pharma industry, analytica Anacon India & India Lab, is also getting a boost because India is a global leader in the drugs industry. Other hot markets include ceramics, laser manufacturing, wastewater management, and the renewable energy sector.

MM | And future hot markets?

SINGH | Pharma, chemicals, and the shows focusing on the environment are huge growth sectors, and of course the star of the show is automotive. Our region is now India's biggest automotive hub. We're also closely monitoring financial services, for example fintech, and the booming start-up sector. Because start-ups are future clients, we have special start-up zones in our exhibitions, which we intend to expand, and give them highly subsidized rates. So our trade shows are very strategically targeted.

MM | What have been the secrets to your success?

SINGH | We are an extremely agile company and go wherever the market is. We do that by keeping our ears close to the ground, and the sound that comes from it is always better than any market research. We think long term—investing in knowledge, clients, and industries that may not bring immediate returns but will in the future. And of course, we are customer-centric.

MM | How do you keep your ear to the ground?

SINGH | We work closely with industry, academics, government ministries, exporters, research institutes, and other stakeholders in India. They form a very important part of our speaker panel for our key buyer groups. They also form thinktanks in our trade show advisory boards, giving us insider information on industry trends. We also get feedback from visitors.



.....
**MESSE MUENCHEN INDIA'S GROWTH IN
 FIGURES (SINCE 2013)**

91,994 more visitors
 2,185 more exhibitors
 70,533 sqm more exhibition space

MM | How important are support programs in India?

SINGH | Very! This is a complex market. For example, intercultural difficulties can make or break a business. So many foreign firms visit our buyer-seller forums to look for an Indian partner to help them develop workable local business models. We're also the only ones in the industry offering B2G forums, where government delegates from relevant ministries address legal framework needs or tax and policy issues, and can answer firms' questions on the spot.

MM | It sounds like there's a lot happening in this market!

SINGH | Yes, and that can take its toll! Especially since we have so many different roles. But I think we all live in a world of disruption and in this age, one needs to adopt a can-do mentality and our team reflects that.

MM | What keeps you up at night in particular?

SINGH | Taking our existing shows into newer markets and keeping an eye on the Tier 2 cities, which are constantly being disrupted by local start-ups. Three years ago, we launched a new show (India Lab Expo) and immediately afterwards, local players launched three more shows on the topic. It took us another three stressful years to become the biggest exhibition in that sector. These kinds of challenges keep you on your toes.

MM | Let's talk about the team. What is the Messe Muenchen India DNA?

SINGH | We put people at the core of everything we do. We constantly invest in our team's growth and development. We have a work culture that encourages dynamic and open communication—a very free environment. I am a big fan of allowing the staff to step out of the office to tank up because office walls can kill the creative spirit. And finally, we celebrate every success, big or small. You know how Indians love Bollywood and cricket? Well, above all, we love to celebrate with staff cricket matches. I think it is a beautiful expression of celebration. ■

SPORTING SPIRIT

BY PETRA KRATZERT | PHOTO: DIRK BRUNIECKI



Being in constant motion. This is health coach Markus Rothermel's favorite state. He teaches companies such as Messe München how to keep body and spirit healthy and balanced. He is convinced that "movement has healing power."

HIGH SPIRITS

Sport scientist Markus Rothermel in the new company gym at Messe München.



The formula is simple: A fit and healthy employee has the energy to work with motivation. This is the ideal state, but desk workers often get pains in their neck, shoulders, and back—plus they gain a kilo or two. Markus Rothermel can detect this at a glance. He loves to work with people to help them feel better.

The sports scientist has a passion for sport and spirit: on the one hand, being in tune with the body, on the other, mastering a technically perfect movement. He has developed a cross-country ski binding, and has for many years trained the German Ski Association's ski instructors. "How do people learn a technically perfect movements?" By honing it continuously.

Rothermel is also a forward thinker in business health management. He was one of the first in Munich to bring physical exercises into companies. Messe München was one of his very first customers. For the last 13 years, Rothermel has been a regular in the building,

in his T-shirt and gym shorts. Even now, with his own sports school, Plus X, and ten employees, he serves Messe München personally. "I just like Messe München," he says. "It was one of my very first customers. I have very close relationships to the people here and train across the hierarchy."

A World Health Organization (WHO) concept inspires Rothermel: the way body parts harmonize will determine health. Important is the balance between spirit, organs, and the skeleton. "The main thing is that you move, regardless of what you do, whether digging in the garden or taking the dog for a walk. What is bad is doing nothing." The effect of sports on the spirit fascinates him. "Sports releases soothing hormones and relaxes. Stress is relieved, the person unwinds." He is convinced that people who exercise physically remain fit in spirit.

His mission is to bring exercise to people, to get them moving, and to show how sports can be both fun and healthy. Twice a week

Messe München employees can join the "exercise break"—or get advice at their desks, for example, on how to manage back pain or to feel generally fitter.

Recently, a 350-square-meter gym was added to Messe München's exercise amenities. Rothermel helped design the studio for "maximum individual flexibility." So there can be no more excuses for not exercising. "The good news is: It's never too late to start. Even ten minutes a day achieves something," he says, with a winning smile.

HIS WORKOUT TIP

The health coach advises: Exercise for ten minutes a day; it will help a lot to balance body and spirit.

THE SHINING LIGHT

BY KATARINA BARIC | PHOTO: DIRK BRUNIECKI

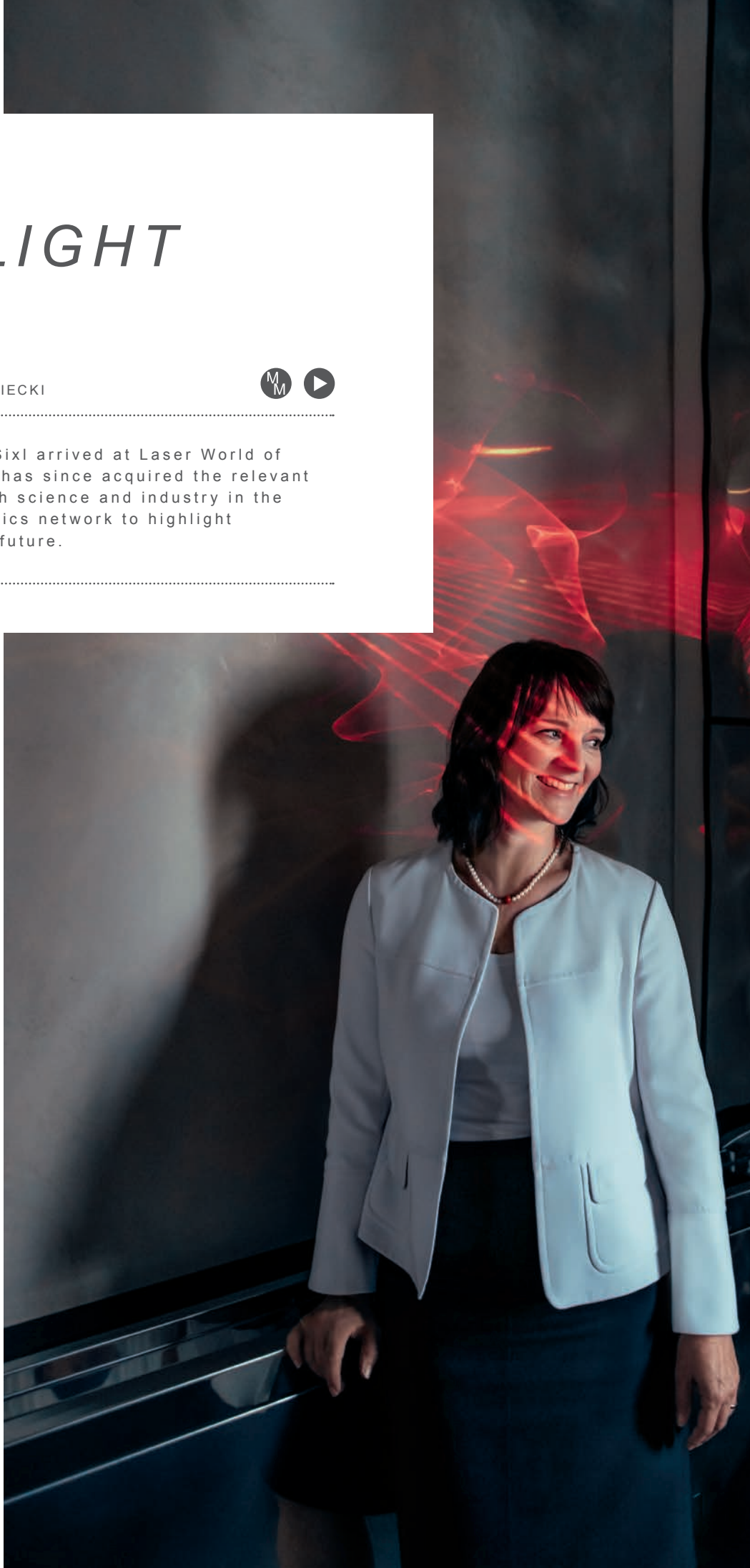


Exhibition Group Director Claudia Sixl arrived at Laser World of Photonics as a non-specialist. She has since acquired the relevant expertise—and today she works with science and industry in the international Laser World of Photonics network to highlight developments in an industry of the future.

Before Claudia Sixl gets to the point, she reaches into her purse—and produces a red VW Beetle. Using the model car, she explains how important photonics is, alone in mobility: Vehicle bodies are cut and welded using lasers. Sensors measure the distance to surrounding objects, thus making autonomously driven vehicles possible in the future. Displays and display elements are made up of LEDs; the headlights increasingly shine using laser light. And whoever finds an unwelcome black-and-white photo in the mail has presumably been caught by a laser radar device.

The 50-year-old knows that you can best describe the unending world of photonics (see cover story on page 8) using practical examples. Let's look at her own experience. The Exhibition Group Director of the Laser World of Photonics network started her career in a totally different field. Her first job was in public relations, prior to which she studied communications science, sociology, and economics. "Of course, I have not become a physicist over the years," Sixl says today. Nevertheless, she has internalized the significance of photonics. Stated simply, photonics utilizes the unique properties of light. For example, its speed or ability to be focused.

"There are so many things that we could not do today without this technology—above all in medicine," says Sixl. And, of course, progress is not meant to stop there. "It is exciting to see the impassioned researchers



who, together with industry, take the development further and take the development further.” The focus of this year’s international Laser World of Photonics in Munich—the fair also has international subsidiaries in China and India—includes, among other things lasers for manufacturing as well as imaging and sensors. These systems are intended to pave the way for smarter cities, for autonomous vehicles, and Industry 4.0.

Claudia Sixl learned about trade fairs at IMAG in Munich, a subsidiary of Messe München. In 2001, she took over Laser World of Photonics, the world-leading trade fair for components, systems, and applications in photonics. Over the years, the foreign trade fairs in China and India were added to Sixl’s portfolio. Later came the analytica network—linked to the world’s most important trade fair for laboratory technology, analysis, and biotechnology, and its regionally leading trade fairs in Asia and South Africa. And, being able to speak with the experts, Claudia Sixl was able to do her homework: a lot of reading, observing, and speaking with customers and partners.

Claudia Sixl and her project team expect around 1,300 exhibitors from 42 countries. The 32,000 specialist visitors will travel from 75 countries. “You can see from this, and the success of our trade fairs, that photonics is an extremely international industry,” says Sixl. “There is global cooperation here not only in research but also in industry.” At its premiere in 1973, the fair was of course somewhat smaller, although similarly international. And even back then, photonics was touted as an industry of the future. “At that time, technologies on display were still looking for an application,” says Claudia Sixl and laughs.

Today, the public eagerly awaits the new products and developments in the industry.

At the top of the wish list, for example, is the quantum computer. One day, it will solve complex tasks in the chemical industry or drive the development of artificial intelligence. “Big companies are already working on the application side,” says Sixl. For example VW, Airbus, and the German Aerospace Center. “This is a huge, exciting topic for the future, which we also address at the fair.”

Theory and practice are merging—not only in the fair but also in its associated congress. Researchers come together, above all, at the World of Photonics Congress. The notable speakers always include Nobel Prize winners who, through the help of laser and photonics technologies, have achieved groundbreaking progress in science. This year, Professor Gérard Mourou is among them. He is one of three laser researchers who were awarded the Nobel Prize in physics in 2018. Claudia Sixl is proud of this: “It makes me really happy that our team always manages to bring these renowned researchers to the congress in Munich.”

Anyone so focused on the future naturally keeps an eye on tomorrow’s generation today. “Start-ups and youth development are very important, they bring something new to the table” says Sixl. To help young people acquire a taste for innovation Laser World of Photonics confers a Start-up Award and stages a makeathon. The latter is a word created from “make” and “marathon.” In these, students have 24 hours to develop a prototype in the photonics area and present it to a jury. Claudia Sixl recognized long ago that interest in technology has generally grown: “Photonics, which used to be a topic only for physicists, is more exciting than ever before, especially to young people.” It is definitively not just for physicists today—as Claudia Sixl knows from her own experience. ■

THE WHOLE SPECTRUM

Since 1973, Laser World of Photonics has reflected the entire value-added chain of photonics. Together with the World of Photonics Congress and other general events, it is the industry’s most important meeting place.

NEW FIELD

Claudia Sixl, born in 1968, began her career in the media industry. Since 1998, she has worked for the Messe München and today is responsible as Exhibition Group Director for, among other things, Laser World of Photonics.

IFAT WORLDWIDE

With over 50 of its own trade fairs, Messe München is one of the world's leading trade fair operators. Its portfolio includes ten world-leading fairs—each of them number one in its industry. Many of its specialist fairs have been running for more than 50 years. This is an indication of how strong they—and Messe München—are. Here, we highlight individual fair clusters in detail. This time: Ifat.

SPRINGING FROM WATER

It all began in 1966 in Munich as the "International Trade Fair for Sewage Technology" [Internationale Fachmesse für Abwassertechnik —Ifat]. Today, Ifat fairs cover all branches of the water economy, from drinking water supplies to the treatment of industrial wastewater to the recovery of raw materials from sewage. And, depending on the region, the focus changes: In South Africa and India the focus is on constructing wells and seawater desalinization; in China, "sponge city" concepts are on the agenda, which aim to sponge up and use rainwater to prevent floods.

USING RESOURCES EFFICIENTLY

Ifat is not just one of the oldest and most successful fairs in the Messe München portfolio. Through its six international events, it has also built the largest trade fair network. And with good reason: Technologies for water, sewage, waste and recycling are key in solving today's urgent environmental problems. Internationalization began in 2004. Today, Ifat takes place in China, India, Turkey and South Africa. Above all, Ifat fairs have one global goal: the efficient use of resources.

IFAT
Eurasia

Istanbul,
every two years,
Spring 2021

IFAT
Africa

Johannesburg,
every two years,
July 9th–11th, 2019

IFAT
India

Mumbai, annually,
October 16th–18th, 2019

IEexpo
中国环博会 · Chengdu
成都

Chengdu, annually,
June 27th–29th,
2019

IFAT

Munich,
every two years,
May 4th–8th, 2020

IEexpo
中国环博会 · CHINA
— Presented by IFAT —

Shanghai, annually,
April 21st–23rd, 2020

IEexpo
中国环博会 · Guangzhou
广州

Guangzhou, annually,
September 18th–20th,
2019

CLOSING THE LOOP

In 1970, Messe München broadened the offering of Ifat by adding the waste management industry segment. Further topics were added gradually. Today, Ifat is also the world-leading fair in this segment of the industry and provides concrete examples of how industries and communities can close the circuit of raw materials. In foreign markets such as India or Turkey, the focus of the fair lies in the establishment of a waste management system that functions nationwide and is accepted by the populace, as well as increasing recycling rates.

FAIR HIGHLIGHTS



RECORD

Covering an area of 614,000 m², the largest Bauma of all time took place in 2019. Eye-catchers were the massive excavators, some as big as single-family houses.



BAUMA

Bauma proved itself again in 2019: The world's leading fair for construction machinery, building-material machinery, mining equipment, construction vehicles, and construction equipment can only be described in superlatives. This year, Bauma achieved the best results of its 65-year-long history, with over 620,000 visitors from more than 200 countries. The exhibitors at Bauma 2019 presented countless innovations and new products to the world. This was also reflected in the order books; many exhibitors were able to log the highest turnover in the history of their participation in the fair. Content-wise, this record-breaking Bauma was characterized by sustainable and digital solutions. Digitalization has been a megatrend for a long time in the construction machine industry. The exceptional status enjoyed by the fair beyond the industry itself was demonstrated by the presence of numerous high-ranking politicians underlined the fair's importance beyond the industry itself. For example, the Federal Minister for Economy and Energy Peter Altmaier described the Bauma as "Germany's showpiece."

STRONG START

CEO of Messe München Klaus Dittrich (2nd f. l.) and Managing Director Stefan Rummel (2nd f. r.), surrounded by political celebrities: (l. to r.) Jonatan Julien, Franz-Josef Paus, Stéphane Dion, Günther H. Oettinger, and Hubert Aiwanger.



INHORGENTA MUNICH

The international trade fair for the watch making, jewelry, and gemstone industry was once again a highlight this trade fair year. Inhorgenta Munich did not only record a positive exhibitor balance. Glamorous events including the jewelry shows and the Inhorgenta Award Gala Evening once again delighted the industry and other guests from the business, media, and cultural sectors.



WINNERS

The best jewelry pieces and designers in eight categories were selected for the Inhorgenta Award. Photo below (l. to r.) Stefanie Mändlein, Bettina Zimmermann, Zoe Helali, Franziska Knuppe.

BAU/THE LONG NIGHT OF ARCHITECTURE 2019

50 buildings, 35,000 visitors, one long night. The Long Night of Architecture took place in 2019 for the fifth time as part of the Bau in Munich. The nocturnal foray through Munich's architectural world was not only aimed at fair visitors, but also at all citizens interested in architecture. On a cold winter's night, they were able to discover spectacular, noteworthy buildings—new and old pearls of Munich architecture—using free shuttle buses on seven routes. The visitors experienced the buildings from totally new perspectives, and gained insights into buildings and spaces not otherwise accessible to the public.



THE HIGHLIGHT OF THE LONG NIGHT OF ARCHITECTURE The Siemens headquarters by Henning Larsen Architects, which opened in 2016.



LAUNCHING THE C5 AND C6 HALLS

December 13, 2018, was a big day for Messe München with the ceremonial opening of the new halls C5 and C6 together with the Conference Center Nord. This completed the original plans for the trade fair facility in Riem, which opened in 1998. More impressions of this highlight can be viewed in the film at: www.messe-muenchen.de/completion

IN HARMONY The Munich Symphony Orchestra played at the gala dinner.

LASER WORLD OF PHOTONICS CHINA

The Laser World of Photonics China took place in March. The fair was a great success with 1,177 exhibitors from 26 countries and over 65,000 visitors.



LASERS IN ACTION Laser technologies continue to advance manufacturing.



RUNNING

The FC Bayern e-sports basketball team was in top form, as was ultrarunner Florian Neuschwander (r.), who won the Ispo Munich Night Run.

ISPO MUNICH

2,943 exhibitors and around 80,000 visitors: For four days long, Messe München was once again the hotspot of the sports world. The Ispo showed how diverse and digital sports have become. For the first time, e-sports were given their own area. Ispo Munich Sports Week was also a great success, which allowed the euphoria of sports to be experienced even beyond the trade fair halls. 157 different events took place over eight days, with 30 partners and 11,800 participants. The kickoff was the Ispo Munich Night Run in the Olympic Park, with 650 participants.



SALESFORCE



LONG-TERM RELATIONSHIP

Attending a trade fair is an appointment with the future. It is a visit brought to life through meetings between people. For this reason Messe München uses digital technologies for communication between visitors and has introduced a new IT system: “We are not renewing just one system, but are also reworking our processes. Many work steps that today are still ‘time intensive’ will disappear in the future. For example, a lot of data no longer needs to be manually entered as it was before,” explains IT project leader Annegret Reuther, talking about the advantages of SALESFORCE—the new IT system. “First of all, we make a digital map of the hall available to our exhibitors, where they can immediately see where their stand will be placed,” says Reuther. With the supplemental digital data, the company can then address the customers on a more individual basis, even after the fair. Long-term relationships are formed from brief meetings!

NEW WORK



A NEW QUALITY OF WORK

Our work environment is fundamentally changing. An innovative generation is coming up and reshaping our everyday work. We have become networked globally, and this is increasingly digital: It is even changing the structure of the world of work. Employees are cooperating more frequently with other business units and managing their projects with more agility and flexibility. At a completely practical level, this means more open space and mobile working. New Work is the epitome of this development and stands for a new quality of cooperation. “At Messe München, New Work means much more than a new office concept. The new world of work is perhaps most obvious here. We want to use the opportunities of newly acquired temporal, spatial, and organizational flexibility in a wide variety of ways,” says Chief Strategy Officer Holger Feist.

The already installed New Work spaces differ markedly from classical open-plan offices. They offer space for individual and creative working, for group collaboration, as well as space for meetings and communication. The key to success lies in the fact that employees can participate in the design of New Work. People who feel good at work also perform better and are more positive about their employer.

Messe München has set up a “New Work” project group, which collects impressions and insights and develops cross-departmental solutions to meet the requirements of modern and future work.

THE NEW WORK PROJECT GROUP VISITS THE HEADQUARTERS OF PULS GMBH

CEO Klaus Dittrich (2nd f. r.) with host Tanja Friederichs (3rd f. r.) and the project group “New Work” (from left to right): Markus Marschalek, Andreas Bischof, Franz Sußbauer, Gerd von Laffert, Betina Selzer, Stefania di Pisa, Aleksandra Solda-Zaccaro and Holger Feist.

TRADE FAIR OF THE FUTURE


CROSS
INDUSTRY

The sports industry lives off consumers physically exercising. Professional and recreational athletes are always looking for new sports innovations. In addition, digitalization is strongly influencing consumer behavior offering new opportunities for retailers and manufacturers. These dynamics require the industry to constantly redefine itself. "Industries beyond our own branch provide important impulses," says Tobias Gröber, Head of Consumer Goods at Messe München and responsible for the Ispo Group. "With Cross Industry, we offer our customers the opportunity to network their know-how with complementary specialist knowledge from other sectors of the economy. Messe München offers special access to these contacts with its portfolio of more than 50 of its own trade fairs for capital goods, consumer goods, and new technologies worldwide. The meeting place for interdisciplinary exchange is the trade fairs. "This is where new ideas emerge," says Gröber. "For example, how functional jackets can be made from plastic waste or sensors can be used to turn an outsole into a personal running trainer. The aim is to bring markets together and initiate new business models."

FAIRLOG


A GREEN LIGHT
FOR FAIRLOG

A truck rarely arrives alone when a small town is erected every three years on the grounds of the Munich Trade Fair Center. This year, it was time, once again: the world's largest trade fair for construction machinery, Bauma, took place in Munich. The construction of Bauma was a logistical masterpiece: with 614,000 square meters of space and an expected 3,500 exhibitors from 55 countries. Messe München introduced a new logistics control system to make the logistics of assembly and dismantling plannable, flexibly controllable, and time-efficient: FairLog, a web-based truck time-slot management system. Via the FairLog portal, exhibitors or their forwarding agents book a time window for their deliveries and pickups and can adapt it flexibly, for example in the event of traffic jams. FairLog project manager Maria Neuhaus (right in picture with Frank Pastior, head of the traffic and security department) reports: "The week before Bauma, up to 4,000 trucks headed for the loading yards of Messe München. Thanks to FairLog, we were able to distribute the vehicles optimally over the days and process them quickly."

NETWORKING


PEER-TO-PEER
IS HERE

Top speaker Jeremy Rifkin coined the term "globalization" to describe the opportunities offered by a smart combination of globalization and localization for the 21st century. Things that interact with one another or a completely new form of mobility, as car sharing already is today: According to Rifkin, further digitalization will completely change the economy and society. "The sharing economy is a completely new thing; there actually is an alternative to capitalism." The sharing economy will also profit in the future from the construction of 5G, which offers new opportunities for the "third industrial revolution." Jeremy Rifkin also opened electronica 2018, which under the slogan "Connecting everything smart, safe & secure" addressed the big topic of the future: the direct connection of technologies and objects in a single Internet of Things (IoT). Electronica India 2019 takes up where electronica 2018 in Munich left off. As the world-leading fair and conference for electronics, electronica is the most important international meeting place for the electronics industry.



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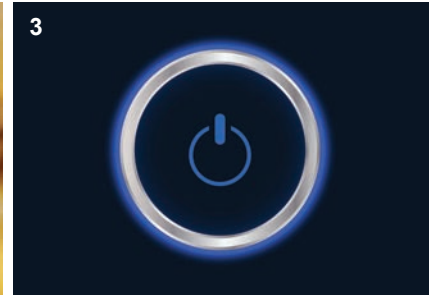
TIME-OUT

Messe München is at home everywhere in the world. Colleagues from around the globe reveal their insider tips.

DISCOVERING MILAN WITH DAVIDE GALLI



DAVIDE GALLI is the Managing Director of Messe München's Italian office abroad in Milan.



1 | Insider tip

SAN MAURIZIO AL MONASTERO MAGGIORE

The Milan version of the Sistine Chapel, even if the two cannot be compared, of course. It dates from the year 1518, is hardly known, has no waiting line and—unbelievably—costs nothing to enter.

Corso Magenta 15 | 20123 Milan | Italy

2 | My favorite product

TORTELLI DI ZUCCA

I recommend Tortelli di Zucca, i.e. pumpkin ravioli, a Lombard and Emilian specialty; that is my native land. Add a glass of real Lambrusco, and your day is saved.

3 | My app recommendation

NONE

Everyone knows the most important apps. However, the OFF button on the cell phone is used too infrequently. It always has a certain charm to it.



THE BRAINLAB TOWER

HIGH PROFILE EVENT LOCATION IN MUNICH

The Brainlab Tower, crowned by its former glass control room, stands at 35 m (115') and is one of the last structural reminders of the aviation history of Munich – Riem. From 1948 to 1992 passengers departed and landed here at the international airport in the Bavarian state capital. Today, this landmarked monument remains outwardly untouched, but inside, the walls host uniquely modern, luxury event spaces for discerning clients. The Brainlab Tower is indeed one of the most beautiful and exclusive event locations in Munich.

With 10 floors and multiple spaces for events from 10 to 350 guests, we offer a full-service approach that can include in-house catering, service personnel, furnishings and even entertainment.

- On-site, state-of-the-art event and media technology
- 130-seat auditorium, conference and training rooms
- Open air spaces, including tower rooftop with stunning views of Munich and the Alps
- Elegant restaurant with open kitchen serving up to 280
- Upscale in-house catering



Situated directly beside the Munich Trade Fair, the Brainlab Tower is the perfect location to host your next break-out session, dinner, conference, party or networking event. Get in touch to discover how we can help make your next event truly extraordinary.





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