

LFSZ

LASERFAIR SHENZHEN

LMN World Laser Manufacturing Conference 2020

12-13 October, 2020
Shenzhen, China

www.world-laserconference.com

SUMMARY

2020

Hannover Milano XZQ Exhibitions (Shenzhen) Co., Ltd



Hannover Milano Fairs Shanghai Ltd



Deutsche Messe



Cooperative Association:
Guangdong Laser Industry Association



广东省激光行业协会
Guangdong Laser Industry Association

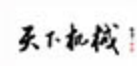
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Dear speakers, participants and media friends,

Thank you very much for your generous support to the LMN World Laser Manufacturing Conference 2020 which took place on 12-13 October. It was very well organized in a blended in-person and virtual format. The two-day event attracted nearly 60 keynote speakers with 1,099 attendees offline. The online visits also reached a high number of over 11,110.

The LMN World Laser Manufacturing Conference is organized by Hannover Milano XZQ Exhibitions (Shenzhen) and Hannover Milano Fairs Shanghai – the subsidiary of Deutsche Messe AG. The top-level conference is targeted to technology innovation and application on par with the competence of optoelectronic industry in South China.

The promising prospect enjoyed and maintained by the laser sector as a sunrise industry of strategic importance has defied the negative impact induced by COVID-19. In China, specifically, industry and businesses are gathering momentum in production and work resumption and the demand for laser equipment has been gradually recovering. In addition, as the largest market of laser equipment in the world, the great potential in China is to be reckoned with. According to Mr. Zhan Gao, Deputy Director of Industry and Information Technology Bureau of Shenzhen Municipality, the city has gradually formed integrated laser industrial systems comprising upstream core components, midstream processing equipment and downstream applications.

Against this backdrop, we are happy to see experts and attendees had interaction, shared opinions and exchanged know-how during the conference. We do hope that this fruitful atmosphere will continue and even more high ranking experts will participate in this forum in the future. Their know-how and suggestions on the development of the laser industry in China as well as in the world in the post-pandemic era are most welcome.

Last but not least, I'd like to take this opportunity to express my heartfelt thanks to all partners, overseas experts, sponsors, exhibitors and supporting units for your crucial contribution to this conference.

We are looking forward to seeing you at the LMN World Laser Manufacturing Conference 2021 in Shenzhen.

Best regards,

A handwritten signature in black ink that reads "Jochen Köckler". The signature is fluid and cursive, with a long horizontal stroke at the end.

Dr. Jochen Köckler
Chairman of the Managing Board,
Deutsche Messe AG

The two-day LMN World Laser Manufacturing Conference 2020 was successfully concluded on 13 October, 2020 in the Shenzhen World Exhibition and Convention Center (Bao'an New Hall). As an important component of LASERFAIR SHENZHEN concurrent with the South China International Industry Fair (SCIIF), LMN 2020 was composed of the plenary session on 12 October and the parallel forums on 13 October, gathering together top experts and representatives of leading enterprises from the optoelectronic industry of the United States, Germany, Russia, Switzerland, Singapore, Lithuania and China to focus on cutting-edge laser technologies, innovative concepts and latest applications. They have discussed the development trend of the global laser industry in the post-pandemic era on the stage of LMN 2020, which provided a platform of exchange and communication for upstream and downstream enterprises and practitioners for knowledge acquisition, application exploration and industrial development.

The Plenary on 12 October was presided over by Prof. Dr. You Wang from Northern Laser Research Institute (Southwest Institute of Technical Physics) and participated by more than a dozen of experts and leading figures including Prof. Dr. Connie Chang-Hasnain, Member of US National Academy of Engineering, Prof. Dr. Yury Kulchin, Academician of Russian Academy of Sciences, Prof. Dr. Carmen Menoni, President of the Institute of Electrical and Electronics Engineers (IEEE) Photonics Society, Dr. Moritz Förster, Managing Director of Working Committee Laser and Laser Systems for Material Processing within VDMA, Prof. Dr. Beat Neuenschwander, One of the Initiators of SWISSPHOTONICS, Prof. Dr. Chunlei Guo from the University of Rochester (USA), Prof. Dr. Anand Asundi, Past-Founding-Chair of Optics and Photonics Society of Singapore, Kestutis Jasiunas, Member of the Board of Lithuanian Laser Association, Prof. Dr. Xiao Zhu, President of Wuhan Laser Association of Optics Valley of China, Prof. Dr. Gang Chen from Chongqing University, Prof. Dr. Zongsong Gan from Huazhong University of Science and Technology and Dr. Daishu Qian, Senior Optical Engineer/Product Manager at Shenzhen JPT Opto-electronics Co., Ltd. with key note speeches. Experts provided displays and engaged in professional and in-depth discussions as well as interaction with the audience on cutting-edge issues such as VCSEL, ultrafast laser, ultrashort pulse laser, prototype development of laser manufacturing equipment, application of photonics in marine monitoring and exploration, and the status quo and market activities of the laser industry in Germany, Singapore, Lithuania and China. Parallel forums on 13 October included ALAT 2020 China Ultrafast Laser Micro-nano Processing Conference, ALAT 2020 China High-energy Laser Automatic Processing Conference and Investment and Finance Summit for Laser and Intelligent Manufacturing Industry 2020. The conferences were well received and highly praised by guests and audience.



Scan the QR code or login to www.world-laserconference.com to watch LMN 2020 replay

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Chinese Laser Industry Community Alliance
Guangdong Laser Industry Association
Shenzhen Association for Science and Technology

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Nanophotonics at Extreme Ultraviolet Wavelengths

Prof. Dr. Carmen Menoni

Distinguished Professor of Colorado State University
2020 President of IEEE Photonics Society

Carmen Menoni has been selected to serve as president of the Institute of Electrical and Electronics Engineers (IEEE) Photonics Society in 2020, who is also University Distinguished Professor of Electrical and Computer Engineering at Colorado State University. Her research bridges from material to optical sciences and her work is published in over 200 archival publications.

Abstract

By virtue of its nanometer-scale wavelength, extreme ultraviolet (EUV) and soft x-ray (SXR) light is naturally suited for nano-photonics applications. The talk described advances in the generation of bright table-top EUV/SXR laser beams and in their implementation in ultra-high resolution imaging, chemical imaging, and defect-tolerant nano-patterning methods. Emphasis was given to the description of extreme ultraviolet laser ablation mass spectrometry. The capability of this method to map elemental and molecular composition with nanoscale spatial resolution in three dimensions and its high sensitivity opens numerous opportunities for investigating, for example, catalysis at nanoscale dimensions and chemical heterogeneity in nanostructures.



VCSEL Array for 3D Sensing

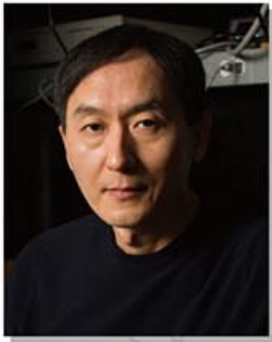
Prof. Dr. Connie Chang-Hasnain

Member of US National Academy of Engineering
2021 President of OSA
Co-Director of Tsinghua Berkeley Shenzhen Institute
Whinnery Distinguished Chair Professor of EECS, University of California Berkeley

Chang-Hasnain serves as 2021 President of The Optical Society (OSA). She is also Chair of Nanoscale Science and Engineering Graduate Group, University of California, Berkeley. She is an Honorary Member of A.F. Ioffe Institute, Chang Jiang Scholar Endowed Chair Professor at Tsinghua University, Visiting Professor of Peking University and National Chiao Tung University. She is Founding Co-Director of Tsinghua Berkeley Shenzhen Institute since 2015.

Abstract

Vertical cavity surface emitting lasers (VCSELs) have long been predicted as low-cost enabling laser sources for many applications including optical communications, sensing and imaging. The mirrors are typically distributed Bragg reflectors (DBRs) with many tens layers of epitaxy layers with alternating refractive indices. Since 2004, we invented a single layer high index contrast near-wavelength gratings (HCG) to replace the hundred-layered DBR in a VCSEL structure. Since then, a new class of planar optics has emerged using near-wavelength dielectric structures, known as high contrast metastructures (HCM). Many extraordinary properties can be designed top-down based for integrated optics on a silicon or GaAs substrate. This talk has reviewed recent results using HCG as mirror for VCSEL and discussed inventions and advances in VCSELs that have led to recent global deployment of commercial applications including 3D sensing, LIDAR and optical coherent tomography applications. Future prospects for advanced applications were also discussed.



Surface functionalization with femtosecond lasers

Prof. Dr. Chunlei Guo

Professor at the University of Rochester

Chunlei Guo is professor at the University of Rochester and the director of the China-U.S. Joint Photonics Laboratory at the Changchun Institute of Optics, Chinese Academy of Sciences. He is mainly engaged in the study of the interaction between femtosecond laser and matter. Professor Chunlei Guo has published more than 170 SCI papers in internationally renowned journals, and has given more than 160 international academic conference reports (including TEDx talk etc.)

Abstract

As a powerful tool for high-precision material processing, femtosecond lasers can pattern materials that are hard to treat and produce surface textures down to nanoscale, far smaller than the light wavelength. In this talk, some of our recent advancements in femtosecond laser micro- and nano-processing were discussed, including the resulting surface structures, the structural formation dynamics, and the drastically altered surface functionalities. A range of ensuing applications were also discussed.



The German Laser Industry: Market Data 2019 and Digitalization Activities

Dr. Moritz Förster

Managing Director of Working Committee Laser and Laser Systems for Material Processing within VDMA
Head of the Photonics Forum

Moritz Förster joined the VDMA in 2019 as Project Manager in the Photonics Forum. Since May 2020, he has served as head of the Photonics Forum and Managing Director of the Working Committee "Laser and Laser Systems for Material Processing". He received his Ph.D. from Frankfurt University in 2018. His research interests include computational chemistry of transition metal complexes, catalyst development and computing of properties.

Abstract

Even prior to the COVID-19 pandemic, there were indications of cooling in the laser industry. Yet even in the midst of the COVID-19 crisis, there are opportunities to be taken, as demonstrated for instance by applications in the Industry 4.0 field. Especially as a result of travel restrictions, digitalization is gaining in significance for fields like remote services and predictive maintenance. One key foundation is provided by the German laser industry's work on OPC UA-based interface standards. The Working Committee Laser and Laser Systems for Material Processing in the VDMA is active in this field.





Photonics for the Monitoring and Development of the Ocean

Prof. Dr. Yury Kulchin

Academician of Russian Academy of Sciences
Vice President of CIS-Laser Association

Yury Kulchin was elected as an academician of the Russian Academy of Sciences in 2011. He is a famous Russian physicist and a distinguished scientist of the Russian Federation. He is currently the vice president of the Far East Branch of the Russian Academy of Sciences and the honorary director of the Institute of Automation and Process Control. He has made outstanding contributions in the fields of optics, laser physics, optical information processing and optical measurement in Russia.

Abstract

The purpose of this report is to present the results achieved at the Institute of Automation and Control Processes of the Far Eastern Branch of the Russian Academy of Sciences in the development of modern photonic methods for monitoring the World Ocean and atmosphere and emerging hazards. The report is supposed to consider the following issues: lidar monitoring of the ocean atmosphere; photonic methods for monitoring the ocean ecology; polarizing-optical monitoring of the sea surface in real time; laser-fluorescent monitoring of the ocean ecology in real time; Laser-spark spectroscopy of the chemical composition of the ocean and its bottom; microalgae as natural indicators of the ocean ecology; means of acoustic and seismoacoustic monitoring of the ocean; laser methods for struggle with corrosion and fouling.



The Developing Tendency and Tasks for Laser Processing

Prof. Dr. Xiao Zhu

Director of National Engineering Research Center for Laser Processing, Huazhong University of Science and Technology
President of Wuhan Laser Association of Optics Valley of China

Professor and PhD supervisor of Huazhong University of Science & Technology. Concurrently served as director of National Engineering Research Center for Laser Processing, Huazhong University of Science and Technology, vice director of Laser Processing Committee of COS and chairman of Wuhan Optical Valley Laser Industry Association. His main research areas include solid-state laser technology and application.

Abstract

Personal understanding of the new situation of laser processing in China and related tasks.



Ultra-short Pulse Laser Micromachining: Scale-Up Strategies for High Throughput

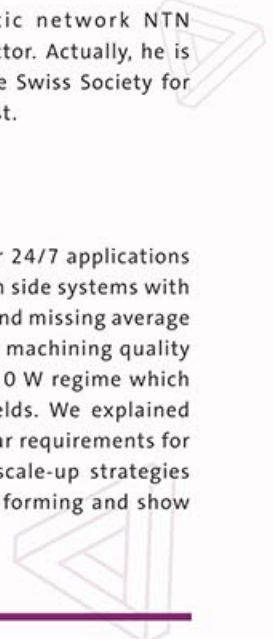
Prof. Dr. Beat Neuenschwander

One of the Initiators of SWISSPHOTONICS
Vice President of Swiss Society for Optics and Microscopy

Beat Neuenschwander is founder member of the national thematic network NTN SWISSPHOTONICS s, which he headed from 2008 – 2011 as managing director. Actually, he is expert for the founding agency innosuisse, head of the optics section of the Swiss Society for Optics and Microscopy SSOM and chair of the LASE symposium at Photonics West.

Abstract

Nowadays ultra-short pulsed lasers are industrial ready products designed for 24/7 applications and are offering average powers in the 100W regime or above. On the research side systems with average powers exceeding 1 KW have been demonstrated by different groups and missing average power is therefore definitively not an issue. On the contrary, to keep the high machining quality many existing applications are limited to rather low average powers in the 10 W regime which hinders the broad usage of ultrashort pulsed lasers in many industrial fields. We explained limiting factors like heat accumulation and/or shielding effects leading to clear requirements for future beam guiding technologies. Based on these findings we discussed scale-up strategies ranging from fast beam scanning devices to multi-spot strategies and beam forming and show some realized examples as well.



Optics and Photonics in Singapore

Prof. Dr. Anand Asundi

Past-Founding-Chair of OPSS
CEO of d'Optron Pte Ltd.

Anand Asundi is founder of d'Optron Pte Ltd., Editor of Optics and Lasers in Engineering . He is also Fellow of SPIE, the International Society of Optical Engineers and Institution of Engineers, Singapore.

Abstract

In this report a brief introduction was provided to the Optics and Photonics activities in Singapore. This included primarily details of the Optics and Photonics Society of Singapore and its activities. It also touched on the research activities in Singapore by the Photonics Institute and one or two corporate members activities.





Cooperation Gives More

Mr. Kestutis Jasiunas

Member of the Board, Lithuanian Laser Association

Kestutis Jasiunas has worked as UAB CEO at EKSPLA since 1997 and as UAB Member of board at EKSMA since 2002. He is also member of Board of Lithuanian Laser Association, vice president of Lithuanian Engineering Industries Association LINPRA, member of Board of The Research Council of Lithuania and member of Scientific Board of Center for Physical Sciences and Technology.

Abstract

The topic of the report is about cooperation between scientists from Vilnius University and two Lithuanian laser companies. The technology invented at Vilnius University in early nineties, later on developed by scientists and business together. It was successfully realized at customer laboratory last year and impressive results have been achieved.



Super-resolution Optical Device and its Applications

Prof. Dr. Gang Chen

Professor at Chongqing University

Since April 2010, Gang Chen has been a professor in the School of Optoelectronic Engineering at Chongqing University, China. His research interests include nano-optics and super-resolution optical devices and systems in visible and terahertz range. He has more than 80 papers published in peer-review journals. He has been granted more than six national research fundings, including National Key Scientific Instrument and Equipment Development Project and National Natural Science Foundation of China. Dr. Chen is a senior member of Chinese Society of Micro/Nano Technology.

Abstract

Abbe diffraction limit of $0.5\lambda/NA$ has long been thought as a basic resolution restriction of conventional optical elements and systems. To overcome this limit, great efforts have been made to realize optical super-resolution in the past decades by engineering the effective point-spread-function of the optical systems Far-field. However, few works have been attempted to overcome the fundamental limitation of optical elements. Recently, there has been a fast development in superoscillatory optical lenses, which allow engineering of optical point-spread functions in the far-field beyond the traditional Abbe diffraction limit. Superoscillation is a mathematical phenomenon in which a light wave contains local frequencies that are large in amplitude. Optical systems employing this phenomenon could improve the ability to distinguish two tiny objects separated by nanoscale-length distances. Recent developments show potential for applications in telescopes, microscopy, and ultrahigh density optical data storage. Improving the design of superoscillatory lenses could overcome challenges in efficiently focusing more of the incident optical energy in a deep-subwavelength scale.



Fast Integrated Development of Laser Manufacturing Equipment Prototype

Prof. Dr. Zongsong Gan

Professor at Huazhong University of Science and Technology

Dr. Zongsong Gan obtained his PhD at Swinburne University of Technology, Melbourne, Australia in 2013. Since 2017, he joins Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology, China as a professor. Dr. Zongsong Gan's research focus on two-beam far-field super-resolution optical nanofabrication technology and its application in information technology. Dr. Zongsong Gan has more than ten years of experience in the research and development of laser manufacturing related equipment. To solve the problem of rapid integrated development of laser manufacturing equipment prototype, a big data software solution based on module integration was proposed, and a corresponding software system was developed.

Abstract

With the rapid development of laser technology, the demand for laser manufacturing related equipment research and development has also grown rapidly. In the process of laser manufacturing related equipment research and development, there have been long-term challenges in the development of laboratory prototypes, and the difficulty of transitioning from laboratory prototypes to engineering prototypes. This makes laser manufacturing equipment development, especially for new markets and new applications, is hard to adapt to the rapid changes in diversified needs. In response to this problem, we proposed a big data software solution based on module integration to realize the rapid integrated development of laser manufacturing equipment prototypes.



History, Mechanisms, and State-of-Art Techniques of Laser Cleaning

Dr. Daishu Qian

Senior Optical Engineer/Product Manager at Shenzhen JPT Opto-electronics Co., Ltd.

Daishu Qian, PhD, graduated from the University of Manchester, is now a senior optical engineer/product manager in Shenzhen JPT Optoelectronics co., Ltd. He has devoted most of his practice to laser cleaning technology over the last 8 years both in the UK and China. He has extensive experience in laser manufacturing, especially laser cleaning in both research and practice.

Abstract

The concept of laser cleaning has been put forward since the beginning of the invention of lasers. After decades of the development, laser cleaning applications have entered many industrial fields and are currently one of the fastest developing directions in the field of laser applications. This report reviews the development history of laser cleaning, and analyzes the principle of laser cleaning from the perspective of the role of laser and material, so as to let more people understand laser cleaning technology. In addition, combined with the technological progress and application status of laser cleaning, people can also get a glimpse of the prospects and trends of the industry's development.

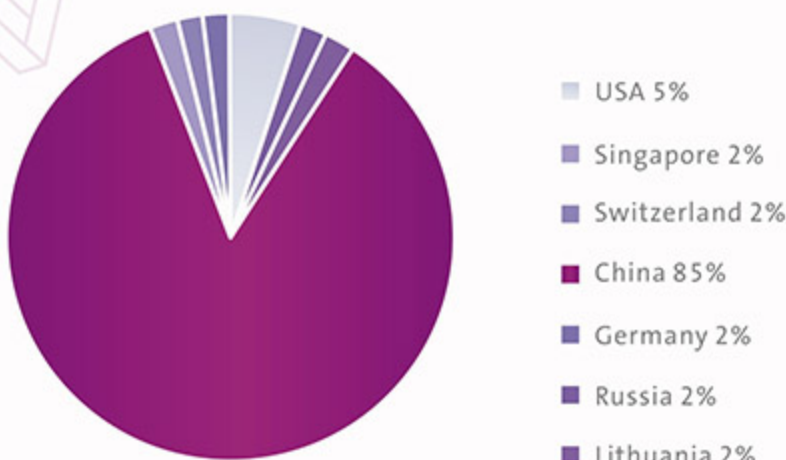
Data Analysis

LMN World Laser Manufacturing Conference 2020 innovatively combined offline and online forms and received positive responses and feedback from the participants. According to statistics, the plenary session on 12 October attracted 367 on-site attendees, while the live broadcast on that day drummed up 5,629 visits. Parallel forums on 13 October witnessed a total of 732 on-site attendees and 5,490 online visits.

Participant Data Analysis

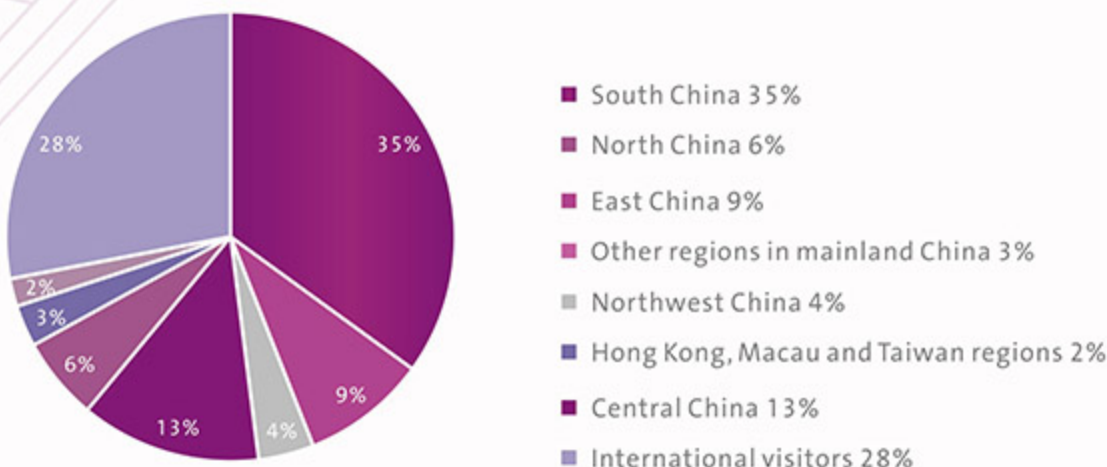
Regional distribution of speakers

The Conference invited nearly 60 authoritative experts in laser industry from 7 countries and regions to give speeches.

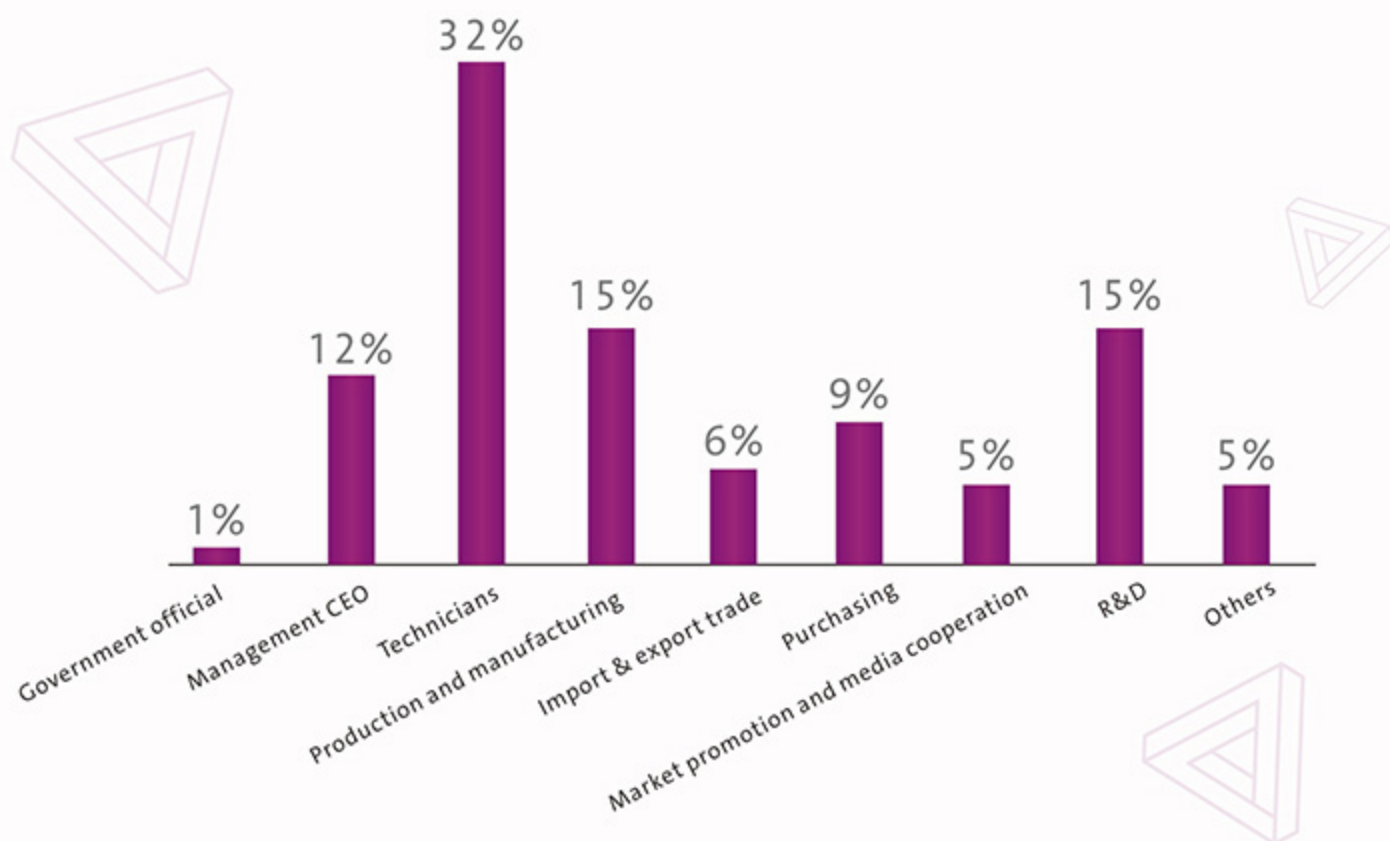


Regional distribution of attendees

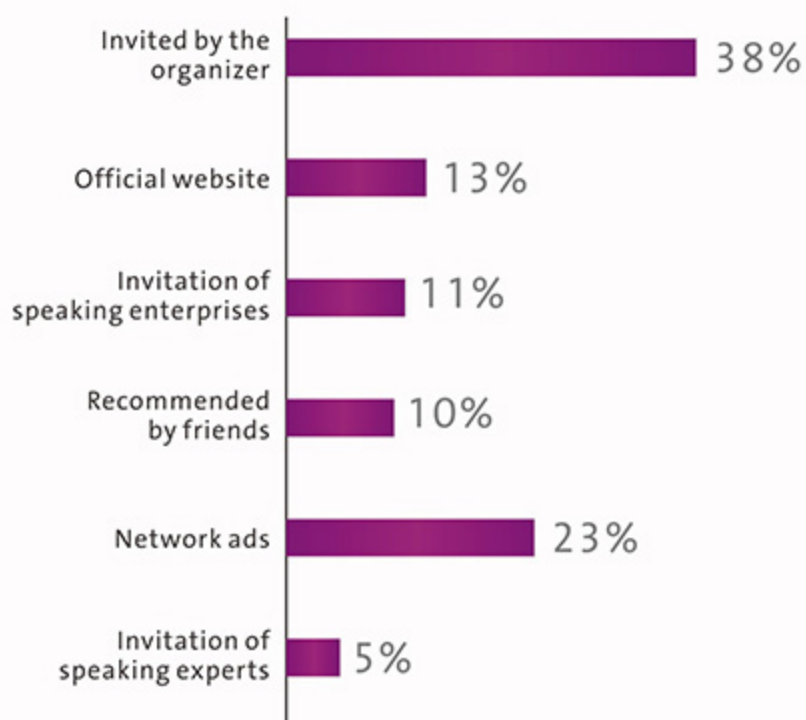
From the aspect of regional distribution, domestic attendees accounted for 72%; international attendees accounted for 28%.



Occupational analysis of attendees



Channel proportion of accessing conference information





TESTIMONIALS



Prof. Dr. Connie Chang-Hasnain
Member of US National Academy of Engineering

It was a great honor to be able to present a Plenary talk at LMN 2020. Congratulations on the successful launch of the conference during this difficult time with hybrid on- and off- line participation. The venue and organization are fantastic!



Prof. Dr. Carmen Menoni
Distinguished Professor of Colorado State University

The LMN World Laser Manufacturing Conference 2020 was extremely well planned and executed. My virtual participation in the plenary session of the conference was flawless. I listened to all the talks in the Plenary session, including mine, and at the end was able to answer questions live. The Plenary talks covered the most advanced laser applications. I hope that in the future, I will have the opportunity to participate in person. The organization and venue of the conference are impressive. The opportunity to share with our Chinese colleagues our work will pave the way to increased collaborations. Congratulations to the organizers of the LMN 2020 conference for its success.



Prof. Dr. Yuri Kulchin
Academician of Russian Academy of Science

It was an honor for me to attend the LMN World Laser Manufacturing Conference 2020. The plenary session of the conference made a great impression on me. Participation in the plenary panel allowed me not only to get acquainted with the latest achievements in the field of photonics, but also to share the results of my research with world experts. I am very sorry that my participation in the conference was held in online regime, which limited my direct communication with carriers of such unique knowledge. The reports of Chinese scientists left an indelible impression on me. For me, this was another proof that China is a developed industrial country today. I am very happy that the partnership between Russia and China is getting stronger every year. This opens up great prospects for cooperation in the field of fundamental photonics and industrial laser technologies.



Dr. Moritz Förster
Managing Director of Working Committee Laser and Laser Systems for Material Processing within VDMA

The LMN 2020 Conference was a complete success from the point of view of the VDMA. I would like to thank, on behalf of the Working Committee "Lasers and Laser Systems for Material Processing" the team of Hannover Milano Fairs Shanghai for the great organization of the event, whether online or on site in Shenzhen.



Prof. Dr. Anand Asundi
Past-Founding-Chair of OPSS

It was a pleasure to speak again at the LMN 2020 event in the new normal. The event was well organized with smooth transition from live to on-line presentations. While live events have their own charm, this event showcased the need for and importance of bringing together people in trying times. Kudos to the organizers and hope we get a chance to meet again in a future event.



Kestutis Jasiunas
Member of Board of Lithuanian Laser Association

It was an honor for me to attend the LMN World Laser Manufacturing Conference 2020. The plenary session of the conference made a great impression on me. There I not only had to learn the latest achievements in the field of photonics, but also had possibility to share the results Lithuanian laser industry and science with world experts. It is pity that my participation in the conference was held in online regime, which limited my direct communication with colleges and specialists from China and all around the world. All reports left an indelible impression on me, especially reports from the Chinese professionals. This opens up great prospects for cooperation in the field of fundamental photonics and industrial laser technologies.



Prof. Dr. Xiao Zhu
President of Wuhan Laser Association of Optics Valley of China
Honorary President of Hubei Laser Society
Director of National Engineering Research Center for Laser Processing, Huazhong University of Science and Technology

This year, I participated in the LMN World Laser Manufacturing Conference 2020 in the whole process, during which I saw the vigorous development of the laser manufacturing industry in Guangdong Province, the great importance attached by the leadership at all levels in Guangdong Province to laser manufacturing as well as the widespread attention and support from all over the world to China's laser industry. These achievements are inseparable from the long-term services of the Organizing Committee in the laser industry. I am convinced that under extensive and in-depth cooperation between Wuhan Laser Association of Optics Valley of China and Guangdong Laser Industry Association, China's laser manufacturing industry will lead the world's development in this regard.



Prof. Dr. Zongsong Gan
Huazhong University of Science and Technology

It is a great honor for me to be invited by the Organizer to participate in and address the LMN World Laser Manufacturing Conference 2020. In the very special background this year, the conference has been a great success! I am very delighted to make many new friends from global academic and industrial communities through the conference, and discuss and make exchanges with them on the latest laser manufacturing technology of the industry, which sprouts my new ideas and inspirations for current research work! Thanks again to the Organizer for its warm and thoughtful arrangements and look forward to the conference next year!



Prof. Dr. Gang Chen
Chongqing University

It's a great honor for me to be invited to the LMN World Laser Manufacturing Conference 2020. It gives me an opportunity to learn from and communicate with top experts and industry leaders in the laser field and laser applications at home and abroad, and learn about current development and future demands of the laser technology and applications, which benefited me a lot. Moreover, by participating in related exhibitions, I further knew about the latest laser application technology in the industry and rapid development of China's laser application technology and related industries. This conference has provided a good communication platform for universities, research institutes, enterprises and users, effectively promoted the integration of application, industry, university and research, and greatly contributed to the development of laser technology and applications. I believe the conference will get better and better and become an internationally renowned laser technology exchange platform in the future.



Dr. Daishu Qian
Shenzhen JPT Opto-electronics Co., Ltd.

It's a great honor to participate in the LMN World Laser Manufacturing Conference 2020, where I communicated with many authoritative experts in the laser sector, and learned about the development of the laser industry in various regions. Thanks to the Organizer for its efforts, and congratulate the success of this conference during the COVID-19 pandemic! I'm looking forward to the next offline event!



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