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Introduction

The 27th International Congress on High-Speed Photography and Photonics (27th ICHSPP) was successfully held at the Xi’an International Conference Center, Xi’an, China, 17–22 September 2006. The 18th ICHSPP was last held in Xi’an in 1988. We are proud to host the congress again in Xi’an after 18 years. Since 1952, this biennial international serial congress has brought together scientists and engineers worldwide to make academic exchange and discussion on high-speed photography. The domain of the congress was extended to photonics in the 13th congress in 1978 in order to reflect the progress of science and technology. In this congress, the scientific scope is further extended to photonics to encourage more scholars to join this community.

More than 300 participants from 15 countries attended the 27th ICHSPP. Countries represented include: Australia, Canada, China, France, Germany, India, Israel, Japan, Netherlands, Poland, Russia, South Africa, Sweden, UK, and USA. Approximately 325 contributions were presented at the congress, split into 8 plenary presentations, 21 parallel session invited presentations, 87 oral presentations and 209 poster presentations. The final papers published in this volume of the SPIE proceedings includes 7 plenary papers, 12 invited papers, 68 oral papers and 190 poster papers. Ten exhibitors contributed to a comprehensive and interesting display of state-of-the-art equipment related to high-speed photography and imaging.

In the tradition of previous congresses, the National Delegates Meeting was held during the 27th ICHSPP. Altogether, 14 national delegates from Australia, China, France, Germany, India, Israel, Japan, Netherlands, Poland, Russia, South Africa, Sweden, the United Kingdom, and the United States, as well as the president of XIOPM and the Administrative Secretary of the Congress attended the meeting at XIOPM, CAS. The national delegates discussed the future development of high-speed photography and photonics. Because of the decrease of high-speed photography, the national delegates collectively decided to modify the name of the congress to “International Congress on High-Speed Imaging and Photonics (ICHSIP),” for the next congress to expand the scope and attract more young scientists. The 28th Congress was determined to be held in Australia in 2008. The 29th Congress was suggested to be held in the Netherlands in 2010.

During the National Delegates Meeting, the winner of the 2006 Hubert Schardin Award was evaluated and decided. At the congress banquet, Prof. Harald Kleine from the Civil and Mechanical Engineering University of New South Wales (Australia) received the 2006 Hubert Schardin Award. Prof. Mikhail Monastyrskiy from the Prokhorov General Physics Institute (Russia) received the 2006 Photo-Sonics Achievement Award.
Grateful acknowledgement is given to our major sponsors:

COS—Chinese Optical Society
XIOPM—Xi'an Institute of Optics and Precision Mechanics, Chinese Academy of Sciences
State Key Laboratory of Transient Optics and Photonics (China)
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Grateful appreciation is also given to the following organizations for their financial support:

NSFC—Natural Sciences Foundation of China
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Jiangsu Provincial Key Laboratory of Modern Optical Technology, Soochow University (China)
Yanshan University (China)
Institute of Fluid Physics, China Academy of Engineering Physics
Institute of Optoelectronics, Shenzhen University (China)
Acta Photonica Sinica

We would like to acknowledge all of the national delegates for their support of this congress. We thank Professor T. Goji Etoh from Kinki University (Japan) for his donation of the Photo-Sonics Achievements Award 2004 ($5000) to the congress. We are also grateful to the many people who made great contributions to the success of the congress, including the organizing committee, session chairs, exhibitors, SPIE staff, and all attendees.

We look forward to meeting you again at the 28th congress in Australia in 2008, and many meetings to come.

Xun Hou
Wei Zhao
Baoli Yao
Congress Awards

2006 Hubert Schardin Award

Prof. Dr. Harald Kleine (Australia)

Presented by Prof. Dr. Manfred Hugenschmidt
Faculty of Electrical Engineering and Information Technique, Institute of High-Frequency and Quantum Electronics, IHQ, University of Karlsruhe, Germany

Dear Professor Hou Xun, dear Professor Wei Zhao, dear chairmen, co-chairmen, members of the Advisory Committee and the Organizing Committee; dear National Delegates, ladies and gentlemen, I greatly appreciate this opportunity to address a few words to the participants of the 27th International Congress on High-Speed Photography and Photonics at Xi’an in China on behalf of the remittance of the Hubert Schardin Award 2006.

First, however, let me acknowledge that China is hosting the High-Speed Congress for the second time. I would like to express my thanks, particularly to Professor Hou Xun, the 27th Congress Chair who also organized the 18th High-Speed Congress in 1988. I personally had the opportunity to attend this first Congress in China, where I met a young PhD student of Prof. Hou. This was Dr. Chang Zenghu who, a few years later, in 1996, received the Hubert Schardin Medal in 1996. At that time Dr. Chang Zenghu was Associate Professor of the XIOPM. He is now a Professor at Kansas State University and during the present Congress he gave a remarkable plenary talk on his Kansas “Attosecond Physics” research program. For participants from abroad, it’s most impressing to see the great progress in China and specifically in Xi’an with its new Conference Center, the new University Campus, Institute, and Laboratory buildings of the Institute of Optics and Precision Mechanics with modern equipment and motivated students.

Concerning the Schardin Award, let me remind you that Hubert Schardin, the founder of the German-French Research Institute Saint-Louis, ISL, and the Ernst-Mach Institute at Freiburg, Germany, was strongly engaged in fostering international relationships and cooperation. Schardin and his friends were highly distinguished pioneers worldwide, convinced that scientific progress can be more efficiently achieved by mutual exchange of information. Since 1952, these conferences were organized bi-annually by participating countries. This allowed the Congress to overcome political constraints and moreover to build up an atmosphere of confidence. Schardin himself gave major contributions. Even a few days before his unexpected death in 1965 he was acting as keynote speaker during the High-Speed Congress in Switzerland. To commemorate Schardin, an
Award was set up by the German Physical Society (Deutsche Physikalische Gesellschaft, DPG) in 1968 for being remitted during forthcoming High-Speed Congresses. The Award consists of a certificate and a golden medal, aimed at:

- recognizing outstanding contributions to previous or current Congresses
- encouraging continued efforts concerning research and applications of high-speed imaging
- fostering international communication and cooperation for improving scientific achievements

It's my pleasure now, to announce the decision of the Price Committee, concerning the remittance of the Hubert Schardin Award 2006. According to the rules set up by the DPG, candidates are to be suggested by the National Delegates, as in previous years. Proposals were thoroughly discussed during the Xi'an Award Committee Meeting. After the evaluation, it was commonly decided that the Hubert Schardin Medal 2006 should be awarded to Prof. Dr. Harald Kleine.

Let me briefly review the curriculum vitae of the laureate.

Harald Kleine was born at Krefeld in Germany in 1960. After his studies at the well known RWTH (Rheinisch Westfälische Technische Hochschule) at Aachen he received his Diploma in Mechanical Engineering in 1986. His efforts for outstanding performance of the graduate course in Mechanical Engineering were acknowledged by the Springorum Medal already in 1987. During the following years, 1987 to 1994, Harald Kleine took over the position of a Research Associate in the RWTH-Aachen Shock-Wave Laboratory. During this time he had several opportunities to temporarily stay abroad as an Invited Researcher, working in Japan in 1992 for several months at Yokohama National University and in 1994 at the Mitsubishi Heavy Industries R&D Center in Takasago.

In 1994, Harald Kleine received a PhD from the RWTH with summa cum laude honors. The subject of his thesis was related to investigations concerning improvements of optical diagnostic methods for applications in gas-dynamic. For this doctoral thesis he received both the Friedrich Wilhelm Price and Borchers Award in 1995. From October 1994 to August 1997, Harald Kleine was staying as Postdoctoral Fellow in the Department of Mechanical Engineering of the McGill University at Montreal, and from 1997 to 1999 as a Senior Research Engineer at the Medical Engineering Systems in Ottawa, Canada.

From 1999 to 2002, Harald Kleine joined Professor Takayama and stayed as an Associate Professor for about three years at the Graduate School of Engineering at Tohoku University in Sendai, Japan. During that time he was involved in various scientific projects related to shock tube physics and improved optical diagnostics. Harald Kleine also strongly supported Professor Kazuyoshi Takayama in preparing the 24th International Congress on High-Speed Photography and
Photonics, the Millenium Congress in 2000. Moreover, he gave several well-received presentations on his current activities in Japan.

Finally, in 2002, Prof. Harald Kleine moved to Australia taking over a responsibility as Senior Lecturer at the School of Aerospace at the University of South Wales of the Australian Defense Force Academy in Canberra. During the present Congress at Xi’an, his two presentations gave an overview of his new activities in Canberra. The broad spectrum of his current research in Australia includes hypersonic physics, high-speed visualization of shock-focusing phenomena, studies of instabilities, supersonic flows around blunt objects, cavitation phenomena for underwater impact processes, supersonic flows over cavities, and further developments and improvements of visualization techniques.

It’s my pleasure now to ask Harald Kleine to come to the stage, also Professor Hou Xun and Professor Wei Zhao, so that both the Certificate of the DPG and the Hubert Schardin Gold Medal can be handed over. Personally, I would like, also in the name of all members of the Award Committee to transmit our congratulations to Professor Harald Kleine with all best wishes for the further scientific and professional career as well as for all private activities in the future.

2006 Photo-Sonics Achievement Award

Prof. Mikhail A. Monastyrskiy (Russia)

Presented by Prof. James Walton
4DVideo (USA)

The Photo-Sonics Achievement Award recognizes outstanding contributions in the field of high-speed imaging. Preference is given to those developments or inventions that have resulted in significant advances in high-speed photoinstrumentation and/or high-speed photography. The award is intended to recognize the contributions of an individual, thus developments or inventions produced by a group are only considered if one person has contributed substantially to the concept and its development. The recognized work must have been performed within the last five years. The award is presented every two years in conjunction with the International High-Speed Imaging Congress. It consists of a plaque and a certificate bearing a citation of the recognized work. It also carries an honorarium of $5,000, which has been donated by Photo-Sonics, Inc., in Burbank, California, since 1970. Administrative support for the award is provided by SPIE, in Bellingham, Washington.

The Photo-Sonics Award Selection Committee is pleased to announce that at this, the 27th International Congress on High-Speed Photography and Photonics, the recipient of the Photo Sonics Award is Prof. Mikhail Monastyrskiy from the
Photoelectronics Department of the Prokhorov General Physics Institute, in Moscow, Russia. The citation for the recognized work is as follows:

The Photo-Sonics Award is presented to Prof. Mikhail A. Monastyrskiy for his significant contributions to the area of High-Speed Photography and Photonics. Prof. Monastyrskiy has developed a reliable basis for qualitative estimations of the dynamic range of pico/femtosecond streak tubes and diffractometers. His efforts have resulted in the use of non-stationary electric fields (in contrast to the stationary types now being used) to compress photoelectron bunches down to the sub-femtosecond level. This provides definite evidence that laser and photoelectron pulses are comparable for recording high-speed events. It is now possible to perform experiments in time-resolved electron diffraction that are improved by two orders of magnitude beyond the 150 to 200 femtosecond measurements now being performed.
Group photo of participants in the Congress.

Prof. Xun Hou, Congress Chair, making his opening remarks and welcoming attendees in the opening ceremony.
The National Delegates Meeting, at XIOPM, CAS

Group photo of the National Delegates at XIOPM, CAS
Prof. Manfred Hugenschmidt (left), Germany, awarding the Hubert Schardin Medal to Prof. Harald Kleine (right), Australia.
Prof. James Walton (left), USA, awarding the Photo-Sonics Achievement Award to Prof. Mikhail Monastyrskiy (right), Russia.

Prof. Wei Zhao (middle), Prof. Mikhail Ya. Schelev (right) and Prof. Zenghu Chang (left), in discussion at the Congress.