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Advanced Optical Concepts in Quantum Computing, Memory, and Communication

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Editors

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Introduction

We are very pleased to bring to you the proceedings of this conference on Advanced Optical Concepts in Quantum Computing, Memory, and Communication. This year brought a large number of experts on optical memories, storage, quantum computing, and quantum communications together. It was a great success that we owe to the participants and the organizing committee.

Since this conference was organized several years ago, the purpose of the meeting has been to bring together those who are working on the forefront of science and technology related to computing and informatics. It provides a unique forum at Photonics West where scientists and technologists can learn and share what is interesting in the foreseeable future of Photonics. Bringing the new, the exciting, and the unique is a never-ending but highly rewarding effort. It keeps us, the organizers, on the edge. Yes, we will make some mistakes once or twice in not identifying the most deserving topics. We seek your help in identifying the ideas you think deserve attention.

By the very nature of this conference, its topics have included many futuristic technologies which were in their initial stages of development or even in their infancy. As some of these fields matured, they claimed a place of their own. Sometimes one or more conferences came out of the topics covered by this meeting. As the new conferences were born more room was created for an ever-growing list of new ideas and potentially important breakthroughs in optical science and technology. Topics covered last year gave birth to two new conferences, one on slow light and the other on quantum meteorology. We wished them all success, and indeed they were successful.

This year, the organizing committee decided to dedicate the first two sessions to two very eminent scientists whom we lost. They were very big contributors to the theme of the conference, and in fact one of them was the cofounder.

The first session was dedicated to the memory of one of our own colleagues, Dr. Hans Coufal, who for many years pioneered the work on optical holographic storage at IBM's Almaden Research Center, San Jose. He was the cofounder of the conference at Photonics West and until his untimely death in September 2006, a cochairman.

Hans was born on January 17, 1945 in Germany. He attended school in Munich, and received his PhD in Applied Physics from the Technical University of Munich. He later spent several years on the faculty in a couple of universities in Germany. In 1981 Hans joined as research staff at IBM, San Jose, in Almaden Science and Technology Division. During his 25 years with IBM, he managed and directed a

large number of diverse projects. Most notable for this conference were holographic data storage, spintronics and Nanoelectronics. In 2005 Hans became the founding director of the Nanoelectronics Research Corporation; a program of the Semiconductor Industry Association that sponsors university research in nanoscale science and technology. During his short tenure there, Hans helped found three new centers for nanotechnology. Hans received many honors and awards including the Bundesverdienstkreuz award from the people of Germany. He was a great friend who appreciated, encouraged, and promoted good science throughout his career nationally and internationally. We will miss his smile, good humor, kind advice, and tireless efforts in promoting the cause of good science.

The second session was dedicated to the memory of Professor Karl Rebane of Institute of Physics, Tartu, Estonia. Karl Rebane was born in 1926 in Pärnu, Estonia. He received his education from Tallinn Polytechnical Institute and Leningrad State University (present St. Petersburg State University, Russia). This is also where he earned his PhD degree in theoretical physics. Karl Rebane was best known in the atomic and molecular optics community for his contributions in the spectroscopy of zero photon lines. Under his guidance, the Institute of Physics in Tartu, Estonia, which he led for many years, became a renowned center for experimental and theoretical studies of optical spectroscopy of solids. It was here that persistent spectral holeburning was discovered in 1974 by Karl's wife Ljubov Rebane's group simultaneously with the group of Roman Personov in Moscow. For several generations of spectroscopists Karl Rebane was known as author of the textbook "Impurity Spectra of Solids" published in 1970. Since his return to Estonia in 1953, and up to his death, November 4, 2007 in his birthplace Pärnu, he was conducting active research and teaching, as well as advancing science in many ways, both at home and internationally.

Our thanks go out to all participants and contributors of the proceedings. It was an exciting meeting, and we hope to see your continued and highly valuable participation in years to come. We would like to especially thank the staff of SPIE with whom we had the pleasure to work with.

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