

# Introduction to the Issue on Silicon Photonics

**T**HIS issue of the IEEE JOURNAL OF SELECTED TOPICS IN QUANTUM ELECTRONICS is devoted to the fast-growing field of silicon photonics, which seeks to develop and integrate photonic components that are compatible with Si integrated circuit technology. Silicon photonics has the potential of leveraging the enormously successful infrastructure developed for the semiconductor industry. Mass production of reliable and inexpensive components and systems that can be readily integrated with silicon microelectronics may become possible, thereby extending the reach of photonics, and revolutionizing the industry by providing a solution to the heat and the data-transfer bottleneck that is threatening the continued advance of Si information technology. Recent developments in the areas of light sources including light-emitting devices and Raman lasers, modulators, switches, photonic crystals, waveguides, photodetectors, and subsystem prototypes demonstrate that silicon photonics is becoming a reality. This issue gathers, for the first time, a large number of papers that have undergone peer review. In all, 14 invited papers and 34 contributed papers, authored by academic, industrial, and governmental scientists and engineers from many countries, cover all the key aspects of silicon photonics.

For convenience, the papers have been organized into four groups: 1) passive microphotonic components; 2) active microphotonic components (including modulators, switches, and photodetectors); 3) light emission, LEDs, and lasers (both

intrinsic and hybrid); and 4) systems. The Guest Editors hope that the experienced silicon photonics researchers will learn about the new advances that will benefit their own research, and that newcomers to the field will learn the state-of-the-art and join the quest for silicon photonics components and systems.

The Guest Editors would like to thank the authors of the papers and the numerous reviewers for allowing them to present the readers with a special issue that is both timely and of high scientific content. Finally, special thanks go to the staff of the IEEE LEOS office and to Mrs. V. Heberling of the University of Rochester, whose tireless dedication to this special issue made it a reality.

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Dr. Fauchet received the IBM Faculty Development Award in 1985, the NSF Presidential Young Investigator Award in 1987, the Alfred P. Sloan Research Fellowship in 1988, and the 1990–1993 Prix Guibal & Devillez for his work on porous silicon. He has chaired many conferences, including the 2005 IEEE Group Four Photonics Conference. He is a Fellow of the Optical Society of America and the American Physical Society.



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