

Silicon Photonics: Opportunity Challenges and Recent Results

Friday, October 5, 2007

3:30 – 5:00pm in LWSN 1142

Presented By:

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2007 Department of Physics Outstanding

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Abstract:

The silicon chip has been the mainstay of the electronics industry for the last 40 years and has revolutionized the way the world operates. Today a silicon chip the size of a fingernail contains nearly one billion transistors and has the computing power that only a decade ago would take up an entire room of servers. Silicon photonics that mainly based upon silicon on insulator (SOI) has recently attracted a great deal of attention since it offers an opportunity for low cost opto-electronic solutions for applications ranging from telecommunications down to chip-to-chip interconnects as well as possible applications in new emerging areas such as optical sensing and or bio-medical applications.

Recent advances and research breakthroughs in silicon photonic device performance over the last few years have shown that silicon can be considered as a material onto which one can build future optical devices. While significant efforts are needed to improve device performance and to “commercialize” these technologies, progress is moving at a rapid rate. If successful, silicon photonics may similarly come to dominate the optical communications industry as it has the electronics industry.

The presentation will provide overview of silicon photonics research at Intel Corporation, describe some of the recent advances in device performance and discuss the key building blocks needed for “siliconizing” photonics. In addition the presentation will provide an overview and discussion on the potential applications and future opportunities for silicon photonics.

Dr. Mario Paniccia is an Intel Fellow and Director of the Photonic Technology Lab at Intel Corporation. Mario currently directs a research group with activities in the area of Silicon Photonics. The team is focused on developing silicon-based photonic building blocks for future use in enterprise and data center communications. Mario has worked in many areas of optical technologies during his career at Intel including optical testing for leading edge microprocessors, optical communications and optical interconnects. His teams pioneering activities in silicon photonics have led to first silicon modulator with bandwidth >1GHz (2004) and the first continuous wave Silicon laser breakthrough (2005). Mario has won numerous awards including in November 2004 Mario was awarded by Scientific American to be one of the top 50 researchers for his teams work in the area of silicon photonics. He has published numerous papers, including 3 Nature papers, 3 book chapters, and has over 65 patents issued or pending. He is a senior member of IEEE and a fellow of OSA. Mario earned a B.S. degree in Physics in 1988 from the State University of New York at Binghamton and a Ph.D. degree in Solid State Physics from Purdue University in 1994.

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