

SEMINAR: Photonics Systems for High Performance

TOLGA TEKIN

January 22, 2025

12:00 to 13:00

Seminar Room

ABSTRACT:

A major hurdle in developing next-generation systems for high-performance applications and industries that require handling large, secure data - such as System-in-Package (SiP) and System-on-Chip (SoC) - is the absence of low-latency, high-bandwidth, and high-density off-chip/chiplet/core interconnects. Achieving high-bandwidth chip-to-chip (or chiplet-to-chiplet) communication using electrical interconnects faces challenges like high substrate dielectric losses, reflections, impedance discontinuities, and susceptibility to crosstalk. This underscores the motivation to adopt photonics to address these challenges and enable low-latency, high-bandwidth communication. The objective is to develop a CMOS-compatible technology to support the next-generation photonic layer within 3D SiP/SoC, moving towards converged microsystems.

BIO:

Tolga Tekin has received the Ph.D. degree in electrical engineering and computer science from the Technical University of Berlin, in 2004. He was a Research Scientist with the Optical Signal Processing Department, Fraunhofer HHI, where he was engaged in advanced research on optical signal processing, 3R-regeneration, all-optical switching, clock recovery, and integrated optics. He was a Postdoctoral Researcher on components for O-CDMA and terabit routers with the University of California. He worked at Teles AG on phased-array antennas and their components for skyDSL. At the Fraunhofer Institute for Reliability and Microintegration (IZM), he then led projects on optical interconnects and silicon photonics packaging. At the Technical University of Berlin, he then engaged in microsystems, photonic integrated system-in-package, photonic interconnects, and 3-D heterogeneous integration research activities.

He is Manager of Photonics and Plasmonic Systems Group at Fraunhofer IZM. His R&D activities cover heterogeneous integration, photonics interconnects, and optical-wireless networks. He coordinated the European Flagship project 'PhoxTroT', 'L3MATRIX', and 'MASSTART', and is currently coordinating the Horizon Europe Flagship project 'ALLEGRO'.

Hosted by: Prof. Dr. Valerio Pruneri