

Workshop speaker	
Full Name	Hyo-Hoon Park
Affiliation	KAIST
Presentation Title	Silicon-based optical phased arrays for wide-angle beam forming
Biography	
<p>Hyo-Hoon Park received the Ph.D. degree in material science and engineering from the Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea in 1985. From 1985 to 1986, he worked in the area of compound semiconductor devices at Stanford University, CA, as a Postdoctoral Scholar. From 1986 to 1997, he was with the Electronics and Telecommunications Research Institute (ETRI), Daejeon, Korea, working in the area of high-speed electronics and vertical-cavity surface-emitting lasers. From 1998 to 2008, he joined the KAIST as a Professor of the School of Electrical Engineering. His major research topics are Si-photonics-based optical interconnection and image sensors, optoelectronic circuits and modules, and optical-link computer systems.</p>	
200 words abstract	
<p>We present the structures and performances of silicon-photonics-based optical phased-arrays (OPAs) to achieve wide field-of-view for LiDAR applications. From 16x(1x16) 2-dimensional OPAs, we demonstrate horizontal and longitudinal beam-forming over 45°. The phase is controlled by the electro-optic effect through current injection to the p-i-n junction formed in the silicon waveguide. For radiators, two different structures of grating and 1-dimensional photonic crystal are examined. The grating radiator shows better performance in the radiation efficiency. In contrast, the photonic crystal radiator shows advantages in widening the horizontal beam-forming angle and in the reproducibility of radiator patterns. We also examined tunable grating radiator using the thermo-optic effect to achieve longitudinal beam-forming with a 1-dimensional OPA. From the tunable radiator, a longitudinal beam-steering above 7° is achieved. This tunable radiator structure can reduce the array number N of the Nx(1xM) 2-dimensional OPAs to cover whole longitudinal beam-forming range. We will compare the detailed performances and tradeoffs for such radiator structures and discuss design issues of the OPAs.</p>	