

## Tutorial 4: Imaging Devices and Systems for Future Society

Speaker: Yusuke Oike (Sony Semiconductor Solutions)

### Abstract:

The evolution of image sensors and the prospects utilizing advanced imaging technologies promise to improve our quality of life. Since CMOS image sensors have surpassed CCDs with the advent of column-parallel ADCs and back-illuminated technology, the image sensor application is expanding to mobile devices, wearables, medical solutions, security networks, factory automation and autonomous driving. Stacking technologies are now drastically accelerating the performance improvement and enhancing the functionality of imaging devices. The fine pitch connection between the pixel and logic layers makes the pixel parallel circuit architecture available for the next evolution. New materials for photoconductive layer extend the sensitivity to a wide range of wavelengths. This tutorial introduces a broad overview of the key device technologies for image sensors, as well as circuit techniques, image signal processing and performance characteristics, that enable imaging applications in various fields. The next challenge of imaging system will be discussed for future society, where the imaging devices integrate edge computing functions and expand the sensing capability of spatial depth, temporal dynamics and invisible light.

### Speaker's Bio:

Yusuke Oike is a Distinguished Engineer of Sony Corporation and a Deputy Senior General Manager of Sony Semiconductor Solutions Corporation. He joined Sony Corporation, where he was involved in research and development of architectures, circuits and devices for image sensors, after he received Ph.D. degree in electronic engineering from the University of Tokyo in 2005. From 2010 to 2011, he was a Visiting Scholar at Stanford University, CA, USA. Currently he is responsible for developing CMOS image sensors at Sony Semiconductor Solutions. His research interests include pixel architecture, mixed-signal circuit design for image sensors and image processing algorithms. He is also a Director of Sony Advanced Visual Sensing AG in Zurich. He was a member of Technical Program Committee of ISSCC and VLSI Symposium, and he currently serves as the Program Chair of VLSI Symposium on Circuits 2021.