



Image Sensors Europe 2022

10-11 May 2022, London, UK

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Conference day one – Tuesday 10 May

<p style="text-align: center;">IMAGE SENSOR MANUFACTURING TRENDS AND BUSINESS UPDATES <i>Chair: Markus Cappellaro, Product Manager and Principal, Carl Zeiss Microscopy Technology Center Munich</i></p>
08:00 Registration and welcome refreshments
08:50 Chair's opening remarks
09:00 Emerging from the global semiconductor shortage, what is the near-term outlook of the CIS industry? <i>Florian Domengie, PhD, Senior Technology and Market Analyst, Yole Développement (Yole)</i>
09:30 Sony's contribution to the smarter industry - technology trends and future prospects for imaging and sensing devices <i>Masafumi Okano, Senior Camera Applications Engineer, Semiconductor & Electronic Solutions, Sony Europe B.V.</i>
10:00 Foundry perspectives – manufacturing and technology trends <i>Amos Fenigstein Ph.D., Managing Director of CIS R&D, Sensors & Displays Business Unit, Tower Semiconductor</i>
10:30 Panel discussion: how is the IS supply chain responding to sustainability and the green agenda?
11:00 Networking break
<p style="text-align: center;">TECHNOLOGY FUTURES – LOOKING OUTSIDE THE BOX <i>Chair: Anders Johannesson, Senior Expert - Imaging Research and Development, Axis Communications</i></p>
11:45 Efficiently detecting photon energy. The spin out from astronomy to industry has been paradigm shifting in the past – will this happen again? <i>Kieran O'Brien, Associate Professor, Astronomical Instrumentation, Centre for Advanced Instrumentation, Durham University</i>
12:15 Angular dependency of light sensitivity and parasitic light sensitivity <i>Albert Theuwissen, Founder, Harvest Imaging</i>
12:45 Augmented reality – the next frontier of image sensors and compute systems AR/VR is believed to be the second great wave of personal computing platform. Introducing some computer vision functions and the associated camera sensor requirements for AR/VR devices. Presenting a new ultra-low power, ultra-wide dynamic range digital pixel sensor (DPS). Moving to

the AR/VR system level – what are the challenges and potential technologies and architecture solutions?

Dr Chiao Liu, Director of Research, Meta Reality Labs

13:15 Networking lunch

PRODUCT VIABILITY, FUNCTIONALITY & APPLICATIONS: GLOBAL SHUTTER AND HDR

14:30 Sensing solutions for in cabin monitoring

In cabin monitoring relies on global shutter pixel technology, high-resolution image sensors and efficient image processing. Most global shutter CMOS image sensors available in the market today have larger pixels and low resolution compared to rolling shutter image sensors. We will present the architecture and operation of backside illuminated voltage mode global shutter pixels with high NIR QE. We will also touch on the challenges of supporting high resolution global shutter operation and low power consumption critical for automotive applications.

Tomas Geurts, Senior Engineering Director, OmniVision Technologies

15:00 Global shutter sensors with single-exposure high dynamic range

Dr. Guang Yang, Vice President Design, Brillnics Inc

15:30 High resolution 4K HDR image sensors for security, VR/AR, automotive, and other emerging applications

This work focuses on the latest high resolution and high dynamic range (HDR) 1/3" and 1/2" image sensors and their advanced features. 1.4 um and 2.1 um pixel arrays were developed to enable the capturing of high performance 4K images and videos. With in-image capture up to 155 dB, HDR sensors provide performance beyond human vision capabilities. We show that near-IR enhancement and non-bayer colour processing enable simultaneous sensing and viewing applications. Latest development in pixel technology and advanced features of these image sensors provide for lower cost and faster time to market for security, automotive, and other emerging solutions.

David Mills, Regional Marketing Manager, EMEA, Intelligent Sensing Group, onsemi

16:00 Networking break

16:30 Bringing colour night vision and HDR image sensors to consumers and professionals

Excellent low light imaging performance and HDR are brought to a new level. The development of CMOS pixels with deep-sub-electron read noise (less than 0.2 photoelectron) and industry-leading dark current (less than 1.3 electron/1um²/second @60C) will be presented. These features enable the implementation of CMOS-based multi-bit quanta image sensors (QIS) with unprecedented low light imaging performance with small pixel sizes. These image sensors can be mass-produced with conventional CIS processes with high yield and realize new imaging features and benefit almost every imaging application.

Dr Saleh Masoodian, CEO & Co-Founder, Gigajot Technology

PRODUCT VIABILITY, FUNCTIONALITY & APPLICATIONS: MULTISPECTRAL IMAGING

17:00 Spectral sensing for mobile devices

Advances in imaging have pushed market growth in mobile devices. Spectral imaging will introduce a next innovation wave, following digital photography and 3D sensing. New applications will be unlocked changing the way we interact with our surroundings. These will impact, amongst others, our personal wellbeing, our health, security and drive e-commerce. Truly-miniaturised and volume-scalable spectral sensors for mobile devices will be introduced, and use cases for mobile environments will be discussed.

Jonathan Borremans, CTO, Spectricity

<p>17:30 Making infrared imaging more accessible with quantum dots <i>Short-wavelength infrared (SWIR) carries a lot of useful information: seeing in adverse weather (automotive), material recognition (sorting), looking through sunglasses (security) are just some examples. SWIR was always limited to niches, as high-cost III-V imagers were the only option. Now, image sensors based on quantum dots promise to become an affordable alternative. Pixel pitch is only readout-limited (sub-2 um shown), resolution can be freely expanded and EQEs above 40% enable plenty of applications. The presentation will give updates on QD SWIR imager progress and approaches to wafer-level manufacturing, leading to volume upscaling and opening of new augmented vision systems.</i></p> <p>Jiwon Lee, <i>Principal Member of Technical Staff, imec</i></p>
18:00 Chair's closing remarks
18:10 Networking drinks reception
19:40 End of day one

Conference day two – Wednesday 11 May

08:00 Registration and welcome refreshments
<p>08:25 Chair's opening remarks Ron Mueller, <i>Associate Consultant, Smithers; CEO, Vision Markets</i></p>
LATEST STANDARDS FOR THE CHARACTERISATION OF IS AND CAMERAS
<p>08:30 Release 4 of the EMVA 1288 standard: adapted and extended to modern image sensors Prof. Dr. Bernd Jähne, <i>Vice President, EMVA (European Machine Vision Association), Professor of Physics and Computer Science, Heidelberg University</i></p>
PRODUCT VIABILITY, FUNCTIONALITY AND APPLICATIONS: DEPTH SENSING
<p>09:00 Design, characterisation and application of indirect time-of-flight sensor for machine vision Dr. Xinyang Wang, <i>Founder, Chairman and CEO, Gpixel Group</i></p>
<p>09:30 Addressing the challenges in sustainability and security with low-power depth sensing <i>With a global focus on sustainability and security, STMicroelectronics is making these challenges central to their product and technology development. The talk will present our journey from 2D passive to 3D active image sensors based on global shutter, fast photodiode and SPAD technologies. Focusing on our new generation low-power, 0.54Mpixel active indirect Time-of-Flight sensor, we will explore depth sensing applications, system performance, optics and technology details that underpin such a product. Our 3D-stacked technologies and wafer-scaled optics solutions set the foundation to enable true edge sensing with embedded intelligence for increased security and reduced overall power consumption.</i></p> <p>Dr Sara Pellegrini, <i>Advanced Photonic Pixel Architect, STMicroelectronics</i> Cedric Tubert, <i>System Architect Leader for Time-of-Flight Products, STMicroelectronics</i></p>
<p>10:00 Establishing LiDAR standards for safe level 3 automated driving Oren Buskila, <i>Chief R&D Officer, Innoviz</i></p>
10:30 Modelling and realisation of a SPAD-based LIDAR image sensor for space applications

From the specifications, a numerical model has been developed and results from the model will be shown, focusing on the simulation strategy. The realised prototype implements a distributed-SiPM architecture for background suppression, automatic sensitivity loop to increase dynamic range and last-hit detection mode for long distance targets. It has a 64x64 pixel resolution with 12.9% fill factor, 48um pitch and 54.5% PDP at 6.6Vex. Presented results are obtained with a 75W peak power 905nm laser in outdoor setup with 30klux. The work was supported by the European Space Agency (project WALLIE).

Alessandro Tontini, Researcher, Fondazione Bruno Kessler

11:00 Presentation title to be confirmed

André Srowig, Senior 3D Imaging Systems Modeling and Architecture Engineer, ams AG

11:30 Networking break

CONSUMER, INDUSTRIAL AND SCIENTIFIC APPLICATIONS
Chair: Renato Turchetta, CEO, IMASENIC Advanced Imaging S.L.

12:00 Low-power Always-on Camera (AoC) architecture with AP-centric clock and 2-way communications

Most cutting-edge smartphones are equipped with an Always-on Camera (AoC) system to automatically unlock the display by face recognition. As continuous monitoring with camera increases power consumption, the AoC system needs to apply aggressive power saving schemes. For effective clock gating, an Application Processor (AP) is able to control the clock in sleep mode, and a CMOS Image Sensor (CIS) needs to inform the AP of all timings about variable behaviour. In this work, we propose a low-power SoC architecture for the AoC with AP-centric clock control and 2-way communication between the AP and the CIS.

Soo-Yong Kim, Principal Engineer System Structure Design, SOC Architecture Team, Samsung Electronics

12:30 Resolution of cinesensors: why higher resolution does not always improve image quality

Michael Cieslinski, Technical Lead, Imaging Front End, ARRI Group

13:00-14:00 Networking lunch

14:00 Latest developments in high-speed imaging for industrial and scientific applications

High speed imaging lets us better understand the kinetics behind fast events but it also reveals the struggle for every photon. The image sensor challenges will be illustrated by discussing the design and operation of a 1.3 Mpixel imager, operating at a full frame rate of 35 kfps. In single kernel operation the frame rate can be increased to 2 Mfps. An outlook to a full frame rate beyond 100 kfps with the same image format will also be presented.

Jeroen Hoet, Chief Business Development Officer, Caeleste

14:30 Event-based sensors – from promise to products

Luca Verre, Co-Founder and CEO, Prophesee

15:00 Development of OPD innovative application, such as fingerprint behind display or standalone biometry solutions

Several applications will be addressed using organic photodiode taking advantage of its unique properties such as ease of process, large area, cost-effectiveness, large wavelength possibility (visible, IR), high EQE, and versatility of integration regarding substrate type. This presentation will focus on overcoming technology roadblocks to develop a complete solution and will illustrate a roadmap for OPD applications.

Camille Dupoiron, Program Manager and IP Portfolio Manager, Isorg

15:30 **Medical applications roundtable**

Chair: [Renato Turchetta](#), *CEO, IMASENIC Advanced Imaging S.L.*

16:00 Speaker to be announced

16:30 Chair's closing remarks

16:40 End of conference