2019 INTERNATIONAL IMAGE SENSOR WORKSHOP
Snowbird Resort, Utah, USA
June 24-27, 2019

PROGRAM

Sunday, June 23rd 2019
18:00 - Registration

Monday, June 24th 2019
08:00-08:30 Registration / Welcome
08:30-08:45 Opening

Session 01
Stacking and Small Pixels
Session Chairs: Yusuke Oike (Sony); Dun-Nian Yaung (TSMC)

08:45-09:00 A new 0.8um CMOS image sensor with low RTS noise and high full well capacity
R01 Takuma Hasegawa

09:00-09:15 A Small-size Dual Pixel CMOS Image Sensor with Vertically Broad Photodiode of 0.61㎛ pitch
R02 Jungbin Yun

09:15-09:30 World first mass productive 0.8㎛ pixel size image sensor with new optical isolation
technology of to minimize optical loss for high sensitivity
R03 Yunki Lee

09:30-09:45 Digital Pixel Image Sensors with Linear and Wide-Dynamic-Range Response Developed by
Pixel-Wise 3-D Integration
R04 Masahide Goto

09:45-10:00 The State-of-the-Art of Smartphone Imagers [abstract]
R05 Ray Fontaine

10:00-10:15 0.8㎛-pitch CMOS Image Sensor with Dual Conversion Gain Pixel for Mobile Applications
R06 Dongyoung Jang

10:15-10:40 Break
Session 02  
Noise  
Session Chair: Bumsuk Kim (Samsung)

10:40-10:55  
Modelling Measured 1/f Noise in Quanta Image Sensors (QIS)  
Wei Deng

10:55-11:10  
Several Process Techniques & Pixel Source Follower Schemes to improve the Pixel Temporal Noise  
Manlyun Ha

11:10-11:25  
Investigation of Field Effect Passivation Performance Using SHG Measurement For BSI Pixel  
Sung-Kun Park

11:25-11:40  
Identifying the Sources of Random Telegraph Noises in CMOS Image Sensors  
Calvin Yi-Ping Chao

11:40-11:55  
CMOS image sensors and plasma process: how PMD nitride charging acts on the dark current  
Yolene Sacchettini

11:55-12:10  
Random Telegraph Noise Caused by MOSFET Channel Traps and Variable Gate Induced Leakage with Multiple Sampling Readout  
Shang-Fu Yeh

12:10-13:45  
Lunch

Session 03  
Poster Presentations  
Session Chair: Edoardo Charbon (EPFL)

13:45-16:55  
Active optical sensing with randomized coded light for intentional interference tolerance  
Unghyun Kim

A Reconfigurable 40nm CMOS SPAD Array for LiDAR Receiver Validation  
Sarrah Patanwala

A 110nm CMOS process with fully depleted high resistivity substrate for NIR, X-ray and charged particle imaging  
Lucio Pancheri
Intrinsic Si Quantum Efficiency, Responsivity, and Other Parameters Temperature Dependence for BSI Image Sensors

Sergey Velichko

Electrostatic surface passivation for p-type BSI image sensors

Thomas Dalleau

Floating Diffusion Dark Current and Dark Signal Non-Uniformity Reduction for High Dynamic Range Overflow Collection Pixels in High Temperature Applications

Michael Guidash

A large-area a-IGZO 256x256 imager using a current-mode transimpedance readout for mammography applications

Florian De Roose

Parameter-free Simulation of Photon-detection Probability in CMOS Single-photon Avalanche Diodes

Chin-An Hsieh

CMOS Single-photon Avalanche Diodes using Gated Reset Circuit with On-chip Pulse Width Modulation

Chun chang Hsu

Fast Charge Transfer in 100µm long PPD Pixels

Ajit Kumar Kalgi

Long Distance Ranging Performance of Gen3 LiDAR Imaging System based on 1x16 SiPM Array

Salvatore Gnocchi

A Low Noise Single-Slope ADC with Signal-Dependent Multiple Sampling Technique

Sanguk Lee

Pixel with nested photo diodes and 120 dB single exposure dynamic range

Manuel Innocent

Fully Depleted SiPMs Optimized for Automotive NIR ToF in 180nm Technology

Amos Fenigstein
P15  Pixel Design Utilized P-type Substrate to Achieve Superior NIR Sensitivity and Resolution with Low Dark Noise  
_Takanori Usuki_

P16  A 132 by 104 10μm-Pixel 250μW 1kefps Dynamic Vision Sensor with Pixel-Parallel Noise and Spatial Redundancy Suppression  
_Chenghan Li_

P17  Extending Dynamic Range at Native Image Sensor Resolution by Pixel Coded Exposure  
_Rahul Gulve_

P18  A versatile 3D stacked vision chip with massively parallel processing enabling low latency image analysis  
_Stephane Chevobbe_

P19  A 2-Mpixel CMOS Image Sensor with Device Authentication and Encryption Key Generation based on Physically Unclonable Function  
_Shunsuke Okura_

P20  A high dynamic range, 1.9 Mpixel CMOS image sensor for X-ray imaging with in-pixel charge binning and column parallel ADC  
_Renato Turchetta_

P21  A Novel Threshold Calibration Methodology for Quanta Image Sensors (QIS)  
_Dakota A. Starkey_

15:30-15:55  Break

P22  DUV Optimized CCD with Oxide Micro-lenses  
_Joseph Summa_

P23  Optimization of fully-depleted PPD gated pixel for achieving high-speed charge transfer  
_Yun-Tzu Chang_

P24  Large Format Global Shutter CMOS Image Sensors  
_Tomas Geurts_

P25  Leakage Current Non-Uniformity and Random Telegraph Signal in CMOS Image Sensor Floating Diffusions used for In-Pixel Charge Storage  
_Alexandre Le Roch_
P26 Demonstration of Monolithically Integrated Pixel Sensors Based on Optical Back Biasing in 28nm node FDSOI Technology
Laurent Grenouillet

P27 Imaging by single quantum processing: large pixels with brains or attopixels without?
Erik H.M. Heijne

P28 SPAD array sensitivity enhancement by diffractive microlens
Jerome Vaillant

P29 SPAD based imaging of Cherenkov light in radiation therapy
Arthur Petusseau

P30 A 2.5μm 9.5 Mpixel high framerate CMOS imager with hybrid output multiplexer and 58Gb/s datarate
Jeroen Rptte

P31 A CMOS Image Sensor with In-Pixel Temperature Sensors for Dark Current Compensation
Accel Abarca Prouza

P32 High speed 25M global shutter image sensor with 2.5um pixel
Cheng Ma

P33 Sensor Modeling and Benchmarking --- Enabling Sensor/Algorithm Co-Design
Andrew Berkovich

16:55 - Poster Viewing
Tuesday, June 25th 2019

Session 04  Pixels & Optics
Session Chair: Hidekazu Takahashi (Canon)

08:30-08:45  Back Side Illuminated, Fully Depleted, Pinned Trench Photo MOS for Imaging Applications
R13  Francois Roy

08:45-09:00  Pixel Technology for Improving IR Quantum Efficiency of Backside-illuminated CMOS Image Sensor
R14  Jonghoon Park

09:00-09:15  An 8-tap CMOS Lock-in Pixel Image Sensor for Short-Pulse Time-of-Flight Measurements
R15  Yuya Shirakawa

09:15-09:30  A technique for phase-detection auto focus under near-infrared-ray incidence in a back-side illuminated CMOS image sensor pixel with pyramid textured interfaces for diffraction.
R16  Tatsuya Kunikiyo

09:30-09:45  Electrical characterization of the backside interface on BSI global shutter pixels with Tungsten-shield test structures on CDTI process
R17  Célestin Doyen

09:45-10:00  Image Artifacts in Backside Illumination CMOS Image Sensors Associated with Electrostatic Charge
R18  Thad Smith

10:00-10:25  Break

Session 05  Photon Counting
Session Chair: Jiaju Ma (Gigajot)

10:25-10:45  Invited Presentation I
I1  Vladlen Koltun - "Learning To See In The Dark"

10:45-11:00  Photon-Counting Imaging with Multi-Bit Quanta Image Sensor
R19  Jiaju Ma

11:00-11:15  Dual Layer 3D-Stacked High Dynamic Range SPAD Pixel
R20  Robert Henderson
Iterative image reconstruction for quanta image sensor by using variance-based motion estimation

Kiyotaka Iwabuchi

Crystalline Selenium-Based Stacked CMOS Image Sensor with in-Pixel Pulse-Generating Operation Suitable for Single-Photon Counting

Shigeyuki Imura

High Dynamic Range Imaging with Quanta Image Sensor

Abhiram Gnanasambandam

Lunch / Social Event

Wednesday, June 26th 2019

Session 6  Range Imaging
Session Chair: Neal Dutton (ST Microelectronics)

A Direct TOF Sensor with In-Pixel Differential Time-to-Charge Converters for Automotive Flash LiDAR and Other 3D Applications

Yibing Wang

1kFPS Time-of-Flight Imaging with a 3D-stacked CMOS SPAD Sensor

Istvan Gyongy

A Close-in LiDAR for Diffusive Media based on a 32 × 32 CMOS SPAD Image Sensor

Scott Lindner

Analysis of a modular SPAD-based direct time-of-flight depth sensor architecture for wide dynamic range scenes in a LiDAR system

Preethi Padmanabhan

A Time-Resolved Lock-in Pixel Image Sensor Using Multiple-Tapped Diode and Hybrid Cascade Charge Transfer Structure

Shoji Kawahito

Pandion: A 400 × 100 SPAD sensor for ToF LiDAR with 5 Hz median DCR and 11 ns mean dead-time

Darek Palubiak
10:00-10:25  **Break**

**Session 7**
Session Chair:  Xinyang Wang (Gpixel)

R30  *Daniel Van Blerkom*

10:40-10:55 **A High Optical Performance 2.8µm BSI LOFIC Pixel with 120ke− FWC and 160µV/e− Conversion Gain**
R31  *Ken Miyauchi*

10:55-11:10 **Sub-pixel architecture of CMOS Image Sensor achieving over 120dB Dynamic-Range with Motion Artifact-less behavior**
R32  *Tomohiko Asatsuma*

11:10-11:25 **A 1280x960 2.8µm HDR CIS with DCG and Split-Pixel Combined**
R33  *Sindre Mikkelsen*

11:25-11:40 **A scalable 12b-16b charge-domain multi-slope column ADC for HDR imagers with 86dB DR at 1 µs conversion time**
R34  *Simon Louwsma*

11:40-11:55 **3.0µm Backside illuminated, lateral overflow, high dynamic range, LED flicker mitigation image sensor**
R35  *Scott Johnson*

11:55-13:30  **Lunch**

**Session 8**
Session Chair:  Alex Krymski (Alexima)

13:30-13:45 **Over 100 Million Frames per Second 368 Frames Global Shutter Burst CMOS Image Sensor with In-pixel Trench Capacitor Memory Array**
R36  *Manabu Suzuki*

13:45-14:00 **Multi-tap macro-pixel based compressive ultra-high-speed CMOS image sensor**
R37  *Keiichiro Kagawa*
14:00-14:15 Evolution of BSI Multi-Collection-Gate Image Sensors -From Light-in-Flight imaging to Giga-fps Continuous Imaging-
R38 Takeharu G Etoh

14:15-14:30 CMOS Sensor with Panel Readout and Serialization using multiple PLLs
R39 Alex Krymski

14:30-14:45 16.7Mpixel 8000fps sparse binarized scientific image sensor
R40 Peng Gao

14:45-15:10 Break

Session 9 New Applications and Non-visible Imaging
Session Chair: Pierre Magnan (ISAE)

15:10-15:30 Invited Presentation II
I2 Dave Shafer, Intuitive Surgical - "Image Sensor Applications in Minimally Invasive Surgery"

15:30-15:45 A Sub-Electron Temporal Noise High Modulation Contrast NIR Lock-In Pixel CMOS Image Sensor for Non-Contact Physiological Measurement
R41 Chen Cao

15:45-16:00 Energy Harvesting Pixel Array with Deep Trench Isolated Diodes for Self-Powered Imaging
R42 Filip Kaklin

16:00-16:15 Advanced Fundus Camera with Color Image Acquisition in 0-lx Visible Light with Innovative NIR Multispectral Imaging System -Application Field Development of Dynamic Intelligent Systems Using High-Speed Vision-
R43 Hirofumi Sumi

16:15-16:30 Organic- and QD-based image sensors integrated on 0.13 μm CMOS ROIC for high resolution, multispectral infrared imaging
R44 Epimitheas Georgitzikis

16:30-16:45 A VGA Optical Filter-less CMOS Image Sensor with UV-selective and Visible Light Channels by Differential Spectral Response Pixels
R45 Yhang Ricardo Sipauba Carvalho da Silva

16:45-17:00 UV Photon Counting Detectors for High-Altitude Balloon and Sounding Rocket Experiments
R46 Shouleh Nikzad
Thursday, June 27th 2019

Session 10  Specialty Imaging  
Session Chair: Shouleh Nikzad (JPL)

08:30-08:45  A Radiation Hardened CMOS Image Sensor with Almost Zero Dark Current Increase During Radiation  
R47  Takashi Watanabe

08:45-09:00  Multi-spectral High-Speed Backside Illuminated TDI CCD-in-CMOS Imager  
R48  Pierre Boulenc

09:00-09:15  Partially Pinned Photodiode Performances in for Emerging Space and Nuclear Applications  
R49  Serena Rizzolo

09:15-09:30  Image Sensor Capable of Analog Convolution for Real-time Image Recognition System Using Crystalline Oxide Semiconductor FET  
R50  Seiichi Yoneda

09:30-09:55  Break

Session 11  Global Shutter  
Session Chair: Assaf Lahav (TowerJazz)

09:55-10:10  Back Side Illuminated High Dynamic Range 4.0μm Voltage Domain Global Shutter Pixel with Multiple Gain Readout  
R51  Kazuya Mori

10:10-10:25  A High Performance 2.5um Charge Domain Global Shutter Pixel  
R52  Ikuo Mizuno

10:25-10:40  Near Infra-Red Enhanced 2.8um Global Shutter Pixel with Light Pipe Structure and High Resistivity P-type Substrate  
R53  Masafumi Tsutsui
10:40-10:55  Global Shutter Efficiency Improvement to >100dB in Advanced Global Shutter Imager with Correction Processing

R54  Kai Shen

10:55-11:10  A BSI Global Shutter Pixel with Background Light Suppression for Multi-Frame Differential Imaging

R55  Xiaoliang Ge

11:10-11:15  Closing Remarks