

2023 International Image Sensors Workshop
Workshop Programme
Sunday 21st May to Thursday 25th May

Sunday 21st May

Delegates travel to Crieff Hydro Hotel, Scotland

Shuttle Buses running from Edinburgh Airport 10am – 8pm

Workshop registration open

Hotel Check In opens (3-5pm not all rooms available, after 5pm all rooms available).

Delegates free time for sports/walks around site.

Delegates must book for Sunday dinner and use of some sporting facilities (pool, spa, golf driving range, tennis, etc)

Dinner (at attendees own expense) in the hotel restaurants.

Monday 22nd May

Breakfast

Session 1:
3D Stacking and Small Pixels

	Paper	Author & Affiliation
R1.1	Trends and Developments in State-of-the-Art CMOS Image Sensors	John H.F. Scott-Thomas (TechInsights)*
R1.2	High Full Well Capacity and Low Noise Characteristics in 0.6 µm Pixels via Buried Sublocal Connections in a 2-Layer Transistor Pixel Stacked CMOS Image Sensor	Masataka Sugimoto (Sony Semiconductor Solutions)*
R1.3	World smallest 200Mp CMOS Image Sensor with 0.56µm pixel equipped with novel Deep Trench Isolation structure for better sensitivity and higher CG	Sungsoo Choi (Samsung Electronics)*
R1.4	0.56µm-pitch CMOS image sensor for high resolution application	Chun Yung Ai (Omnivision)*
R1.5	A 0.64µm 200Mp Stacked CIS with Switchable Pixel Resolution	MINHO KWON (Samsung Electronics)*; Il-Seon Ha (Samsung Electronics); YUN JUNG KIM (Samsung Electronics)
R1.6	Image sensor family with 1.40 µm pixel, 10ke- LFW, NIR-enhanced QE, dual gain readout, and low power consumption	Radu Ispasoiu (ON Semiconductor)*

Coffee Break

Session 2:
Noise

	Paper	Author & Affiliation
R2.1	Hot Carrier Injection Induced Random Telegraph Noise Degradation in a 0.8µm-pitch 8.3Mpixel Stacked CMOS Image Sensor	Calvin Y Chao (TSMC)*
R2.2	Gate Oxide Benchmarking For Low Frequency Noise Improvement On 3D Stacked CMOS Image Sensors	Maria M Gouveia da Cunha (STMicroelectronics and ISAE-Supaero)*; Sebastien Place (STMicroelectronics); Olivier Gourhant (STMicroelectronics); Sebastien Haendler (STMicroelectronics); Pierre Magnan (ISAE-SUPAERO); Philippe Martin-Gonthier (ISAE-SUPAERO); Vincent Goiffon (ISAE-SUPAERO)
R2.3	Exploring Space-Radiation Induced Random-Telegraph-Signal in a Sony IMX219 CMOS Image-Sensor	Aubin Antonsanti (ISAE SUPAERO)*; Alexandre Leroch (NASA GSFC); Jean-Marie Lauenstein (NASA GSFC); Vincent Goiffon (ISAE-SUPAERO); Cedric Virmontois (CNES)
R2.4	Low Temperature Lag-induced FPN of Dual Transfer Global Shutter Pixels under Low Illumination Conditions	Xiaoliang Ge (Gpixel)*; Assaf Lahav (Gpixel); Masafumi Tsutsui (Tower Partners Semiconductor Co.,Ltd.); Masakatsu Suzuki (Tower Partners Semiconductor Co.,Ltd); Tadashi Imoriya (Tower Partners Semiconductor Co.,Ltd)
R2.5	Reduction of RTS noise by optimizing fluorine implantation in CMOS image sensor	Sungyong You (Samsung Electronics)*
R2.6	Dark Current Compensation of a CMOS Image Sensor by Using In-pixel Temperature Sensors	Accel Abarca (INL - International Iberian Nanotechnology Laboratory)*; Albert Theuwissen (Harvest Imaging, Belgium / Delft University of Technology, The Netherlands)

Lunch

Session 3:
Pixel Design & Process Technology

	Paper	Author & Affiliation
R3.1	0.6µm F-DTI based Quad-cell with Advanced Optic Technology for All-pixel PDAF and High Sensitivity/SNR Performance	Junsik Lee (Samsung Electronics)*; Eunji Yong (Samsung Electronics); Jonghoon Park (Samsung Electronics); Junghyun Kim (Samsung Electronics); Gyeong Jin Lee (Samsung Electronics); Yunki Lee (Samsung Electronics); Seungjoon Lee (Samsung Electronics); et al.
R3.2	Low-noise 3-D Bending Pixel Transistor for Small Pixel CMOS Image Sensors Applications	Kyoung eun Chang (Samsung Electronics)*
R3.3	Near-infrared sensitivity enhancement of silicon image sensor with wide incident angle	Atsushi Ono (Shizuoka University)*; Takahito Yoshinaga (Shizuoka University); Kazuma Hashimoto (Shizuoka University); Nobukazu Teranishi (Shizuoka University)
R3.4	Light Intensity and Charge Holding Time Dependence of Pinned Photodiode Full Well Capacity	Ken Miyauchi (Brillnics Japan Inc.)*; Toshiyuki Isozaki (Brillnics Japan Inc.); Rimon Ikeno (Brillnics Japan Inc.); Junichi Nakamura (Brillnics, Japan)
R3.5	Improved QE in CMOS image sensors with nano-black antireflection layer	Martin Prest (The Open University)*; Olli Setälä (Aalto University); Konstantin Stefanov (The Open University); Ville Vähänissi (Aalto University); Hele Savin (Aalto University)
R3.6	A customized 110nm CMOS process for large-area radiation detection and imaging	Lucio Pancheri (University of Trento)*

Coffee Break

Session:
Posters & Flash Presentations

	Paper	Author & Affiliation
P1	A 607MHz time-compressive computational pseud-dToF CMOS image sensor	Pham N Anh (Shizuoka University)*; Thoriq Ibrahim (Shizuoka University); Keita Yasutomi (Shizuoka University); Shoji Kawahito (Shizuoka University); Hajime Nagahara (Osaka University); Keiichiro Kagawa (Shizuoka University)
P2	Histogram-free direct time-of-flight imaging based on a machine learning processor on FPGA	Tommaso Milanese (EPFL)*; JIUXUAN ZHAO (EPFL); Brent Hearn (STMicroelectronics); Edoardo Charbon (EPFL)
P3	A 9-shared 3x3 Nonacell Image Sensor with 0.64µm unit pixels for Read Noise and Low-illuminance SNR enhancement	Wonchul Choi (Samsung electronics)*; Munhwan Kim (Samsung electronics); Junoh Kim (Samsung electronics)
P4	Light-Emission Crosstalk Model and Dynamic Correction Algorithm for Large-Scale SPAD Image Sensors	Ayman T Abdelghafar (Canon)*; Kazuhiro Morimoto (Canon); Hiroshi Sekine (Canon); Hiroyuki Tsuchiya (Canon); Mahito Shinohara (Canon); Yasuharu Ota (Canon); Junji Iwata (Canon); Yasushi Matsuno (Canon); Katsuhito Sakurai (Canon); Takeshi Ichikawa (Canon)
P5	Optimal biasing and physical limits of DVS event noise	Rui Graca (Institute of Neuroinformatics - UZH and ETH Zurich)*; Brian J Mcreynolds (AFIT/CI, Institute of Neuroinformatics, UZH/ETH Zurich); Tobi Delbruck (Nil)
P6	Metasurface-based planar microlenses for SPAD pixels	Jérôme Vaillant (CEA-LETI)*; Lucie Dilhan (ST Microelectronics); Alain Ostrovsky (STMicroelectronics); Quentin Abadie (CEA-LETI); Lilian Masarotto (CEA-LETI); Romain Paquet (CEA-LETI); Mickaël Cavalier (CEA-LETI); Cyril Bellegarde (CEA-LETI)
P7	Single-Shot Multispectral Imaging by Flexible Coded-exposure-pixel CMOS Image Sensor	Roberto Silva (University of Toronto)*; Ayandev Barman (University of Toronto)
P8	A SPAD-based linear sensor with in-pixel temporal pattern detection for interference and background rejection with smart readout scheme	Alessandro Tontini (University of Trento)*; Leonardo Gasparini (Fondazione Bruno Kessler); Roberto Passerone (University of Trento)
P9	Count-Free Histograms with Race Logic for Single-Photon LiDAR	Atul N Ingle (Portland State University)*; David Maier (Portland State University)
P10	A Study on Two Step Reset LOFIC Pixel to Reduce SNR Gap	Kazuki Tatsuta (Research Organization of Science and Engineering Ritsumeikan University)*
P11	High Precision direct-ToF Ranging using CMOS SPAD and Ultra-short Pulsed Laser	Tsai-How Hsu (National Yang Ming Chiao Tung University)*; Sheng-Di Lin (National Yang ming Chiao taug University); Tzu-Hsien Sang (National Yang ming Chiao taug University); Gray Lin (National Yang ming Chiao taug University); Chen-Hsien Liu (National Yang Ming Chiao Tung University)
P12	High-speed, super-resolution 3D imaging using a SPAD dToF sensor	German Mora Martin (University of Edinburgh); Jonathan Leach (Heriot-Watt University); Robert Henderson (The University of Edinburgh); Istvan Gyongy (University of Edinburgh)*
P13	Self-Powered Ambient Light Sensor Using Energy Harvesting Pixels and Zero Power Communication.	Benjamin Sarachi (ST Microelectronics)*; Angus Cook (ST Microelectronics); Jeffery Raynor (ST Microelectronics); Iliana Torodova (ST Microelectronics); Stuart Ball (ST Microelectronics); Filip Kaklin (ST Microelectronics); et al.
P14	An Efficient Direct Time-of-Flight (dToF) LiDAR System Based on High Resolution SPAD Array	Tze Ching Fung (Samsung Semiconductor Inc.)*; Yibing M. Wang (Samsung Semiconductor, Inc.)
P15	Low-Complexity Learning-based Low-Light Denoising and Demosaicking for Quanta Image Sensors	Stanley Chan (DeepLUX Technology Inc.)*; Yiheng Chi (DeepLUX Imaging); Preston Rahim (DeepLUX Technology Inc.)
P16	Cyber Security for CMOS Image Sensors	Boyd A Fowler (OmniVision Technologies)*; Wenshou Chen (OmniVision Technologies); Kevin Johnson (OmniVision Technologies)
P17	A CMOS Image Sensor With 1.6µs Conversion Time 10-bits Column-Parallel Hybrid ADC Using Self-Adaptive Charge-Injection Cell	Chih-Cheng Hsieh (National Tsing Hua University)*; Yu-Hsiang Huang (National Tsing Hua University); Min-Ruei Wu (National Tsing Hua University)
P18	Charge Demultiplexing for an Ultra-High-Speed Charge-Domain CMOS TDI Image Sensor with a multi-MHz Line Rate	Hyun Jung Lee (Teledyne DALSA)*
P19	Detecting Short-wavelength Infrared Photons by Schottky-barrier based Single Photon Avalanche Diode in 180-nm CMOS Technology	Chen-Hsien Liu (National Yang Ming Chiao Tung University)*; Yu-Wei Lu (National Yang Ming Chiao Taug University); Sheng-Di Lin (National Yang Ming Chiao Taug University)
P20	A Burst Mode 20Mfps Low Noise CMOS Image Sensor	Xin Yue (Dartmouth College)*; Eric Fossum (Dartmouth College)

P21	Towards Infrared Spectral Extension of CMOS Image Sensors	Kaitlin M Anagnost (Dartmouth College)*; Xiaoxin Wang (Dartmouth College); Xin Yue (Dartmouth College); Shang Liu (Dartmouth College); Jifeng Liu (Dartmouth College); Eric Fossum (Dartmouth College)
P22	Chip-level Performance Analysis using Test Element Group Devices for indirect Time-of-Flight CMOS Image Sensor	Seunghyun Lee (Samsung Electronics)*; Jungwook Lim (Samsung Electronics); Minhee Son (Samsung Electronics)
P23	Silicon Metalens for a fully Silicon integrated iTOF SWIR sensors	Matthieu J.o. Dupre (Qualcomm Technologies Inc.)*; Jian Ma (Qualcomm Technologies Inc.); Biay-Cheng Hseih (Qualcomm Technologies Inc.); Sergio Goma (Qualcomm Technologies Inc.)
P24	Toward a Photon Counting Detector for X-ray Imaging by Direct Deposition of Scintillator on 32x32 CMOS SPAD Array	Jau Yang Wu (National Yang Ming Chiao Tung University)*
P25	Feedback Control of a Block-Wise-Controlled Image Sensor Based on Brightness Distribution Analysis	Kohei Tomioka (NHK STRL)*
P26	Analysis of Backside Illuminated CMOS pixels' Quantum Efficiency under Ultraviolet Illumination	Nour Fassi (STMicroelectronics - ISAE SUPAERO)*; Jean-Pierre Carrere (STMicroelectronics); Edgar Leon Perez (STMicroelectronics); Pierre Magnan (ISAE-SUPAERO); Magali Estrideau (ISAE-SUPAERO); Vincent Goiffon (ISAE-SUPAERO)
P27	Near Infrared Quantum Efficiency Simulations for CMOS Image Sensors	Andrew E Perkins (onsemi)*; Swarnal Borthakur (onsemi)
P28	Metasurface-based planar microlenses applied to Back-Side Illuminated CMOS pixels	Martin LEPERS (STMicroelectronics)*; Jérôme Vaillant (CEA-LETI); Alain Ostrovsky (STMicroelectronics); Patrice Genevet (CRHEA); Stéphane Lanteri (Inria Atlantis Team)
P29	A hybrid, back-illuminated image sensor for high QE visible and infrared detection	Renato AD Turchetta (IMASENIC)*
P30	On-chip narrow angle filter development	Dmitry Veinger (Tower semiconductor)*; Naor Inbar (Tower semiconductor); Adi Birman (Tower Semiconductor); Amos Fenigstein (TowerJazz); Shirly Regev (Etesian Semiconductor)
P31	Correlations between DCR and PDP of SPAD integrated in a 28 nm FD-SOI CMOS Technology	Shaochen Gao (INSA Lyon - INL); Dylan Issartel (STMicroelectronics); Mohammadreza Dolatpoor Lakeh (University of Strasbourg - Icube); Fabien Mandorlo (INSA Lyon - INL); Regis Orobchouk (INSA Lyon - INL); Jean-Baptiste Kammerer (University of Strasbourg - Icube); et al.
P32	A new digital pixel for particle detection	Nicola Massari (Fondazione Bruno Kessler)*
P33	A Study on a Feature Extractable CMOS Image Sensor for Low-Power Image Classification System	Shunsuke Okura (Ritsumeikan Univ.)*
P34	Temporal Noise Suppression Method using Noise Bandwidth Limitation for Pixel-Level Single-Slope ADC	Sangwon Lee (Samsung Electronics Co., Ltd.); Min-Woong Seo (Samsung Electronics Co., Ltd.); Masamichi Ito (Samsung Electronics Co., Ltd.); Sung-Jae Byun (Samsung Electronics Co., Ltd.); Hyukbin Kwon (Samsung Electronics Co., Ltd.); et al.
P35	The source-to-gate capacitance of the in-pixel source follower: a positive feedback during charge sensing which increases column settling time and noise voltage.	Peter G Centen (PeerImaging)*
P36	A Charge pump based TDI accumulator for CMOS Image Sensors	Rahul Kumar Singh (IIT Delhi)*; Siddhant Jain (DV2JS Innovation); Aakash Vishwakarma (DV2JS Innovation); Mukul Sarkar (Indian Institute of Technology Delhi)
P37	Understanding 3D imaging performance in sensors with angle-sensitive pixels	Pascal Gregoire (Airy3D)*
P38	A SPAD based TAC Pixel with Logarithmic and Linear Multi-mode Operation for Compressed LiDAR Ranging by Direct ToF Measurement	Kapil Jainwal (Indian Institute of Technology Bhilai)*; Sohail Faizan (Indian Institute of Technology Bhilai)
P39	A back-illuminated full-frame low-noise HDR 8µm, 12Mpixel, 34fps image sensor for industrial, medical and scientific applications	Adria Bofill (IMASENIC)*
P40	A DISRUPTIVE IMAGER ARCHITECTURE WITH PER-PIXEL ADCS FOR HIGH PERFORMANCE HD THERMAL FOCAL PLANE ARRAYS	Gene Petilli (Owl Autonomous Imaging)*
P41	Backside Illuminated Low Noise Embedded CCD image sensor with Multi Level Anti Blooming functionality	Olaf M. Schrey (Fraunhofer Institute of Microelectronic Circuits and Systems)*
P42	High Dynamic Range Pinned Photodiode Pixel with Floating Gate Readout and Dual Gain	Konstantin Stefanov (The Open University)*; Martin Prest (The Open University)
P43	Ultra-sensitive CMOS image sensor capable of operating down to 200 ulx at 60 fps	PIERRE PF FERREYRE (Teledyne e2v)*; BRUNO GILLI (Teledyne e2v); Stéphane Gesset (Teledyne e2v); Alexandre Charlet (Teledyne e2v); Philippe Kuntz (Teledyne e2v)
P44	Evolution of a 4.6 µm, 512×512, ultra-low power stacked digital pixel sensor for performance and power efficiency improvement	Rimon Ikeno (Brillnics Japan Inc.)*; kazuya Mori (Brillnics); Ken Miyauchi (Brillnics Japan Inc.); Masayuki Uno (Brillnics Japan Inc.); Toshiyuki Isozaki (Brillnics Japan Inc.); et al.

Dinner

Breakfast

Session 4:
HDR and Automotive

	Paper	Author & Affiliation
R4.1	A 3.0um-pixels and 1.5um-pixels combined CMOS Image Sensor for Viewing and Sensing Applications with 106dB Dynamic Range, High-Sensitivity, LED-Flicker Mitigation and Motion Blur-less	IIDA SATOKO (Sony semiconductor solutions)*; Kawamata Daisuke (Sony semiconductor solutions); SAKANO YORITO (Sony semiconductor solutions); Yamanaka Takaya (Sony semiconductor solutions); Nabeyoshi Syohei (Sony Semiconductor Manufacturing); Matsuura Tomohiro (Sony semiconductor solutions); et al.
R4.2	Automotive CMOS Image Sensor family with 2.1um LFM pixel, 150 dB Dynamic Range and High Temperature Stability	Manuel Innocent (onsemi)*; Sergey Velichko (ON Semiconductor)
R4.3	Automotive 2.1 µm Full-Depth Deep Trench Isolation CMOS Image Sensor with a Single-Exposure Dynamic-Range of 120 dB	DONGSUK YOO (SAMSUNG)*; Eunji Park (Samsung electronics); YOUNGCHAN KIM (Samsung Electronics); Kangsun Lee (Samsung electronics); Seojoo Kim (Samsung electronics); JOONG SEOK PARK (Samsung Electronics); Seungho Shin (Samsung Electronics); et al.
R4.4	110dB High Dynamic Range Continuous Non-Uniform TTS and Linear ADC Scheme Using A 4.6 µm Stacked Digital Pixel Sensor	Toshiyuki Isozaki (Brillnics Japan Inc.)*; Rimon Ikeno (Brillnics Japan Inc.); Ken Miyauchi (Brillnics Japan Inc.); kazuya Mori (Brillnics)
R4.5	A 5MPixel Image Sensor with 3.45um Dual Storage Global Shutter BSI Pixel with 90dB DR	Tomas Geurts (omnivision)*
R4.6	A High Dynamic Range APS-C Sized 8K 120-fps Stacked CMOS Image Sensor	Wesley Cotteleer (GPixel)*; Jan Bogaerts (Gpixel)

Coffee Break

Session 5:
Smart and Event-based Imagers

	Paper	Author & Affiliation
R5.1	A 90dB single-shot HDR, 0.5MP global-shutter image sensor with NIR QE enhancement, 20mW power consumption and smart event detection modes	Adi Xhakoni (ams OSRAM)*
R5.2	An InGaAs Multi-Functional Fast SWIR Imager with Event-based and Laser Multi-spot Sensing	Claudio G Jakobson (SCD)*; Rami Fraenkel (SCD); Nimrod Ben Ari (SCD); Roman Dobromislin (SCD); Niv Shiloah (SCD); Tomer Argov (SCD); Willie Freiman (SCD); Gal Zohar (SCD); Lidia Langof (SCD); Oren Ofer (SCD); Rahel Elishkov (SCD); Edan Shunem (SCD); et al.
R5.3	Guided Flash Lidar: A Laser Power Efficient Approach for Long-Range Lidar	Filip Taneski (University of Edinburgh)*; Robert Henderson (The University of Edinburgh); Tarek Al Abbas (Ouster); Istvan Gyongy (University of Edinburgh)
R5.4	FAD-SPADs: a New Paradigm for Designing Single-Photon Detecting Arrays	Mel White (Rice University)*; Tianyi Zhang (Rice University); Akshat Dave (Rice); Shahaboddin Ghajari (Cornell University); Alyosha C Molnar (Cornell University); Ashok Veeraraghavan (Rice University)
R5.5	Pixel Modeling and Parameter Extraction for Event-based Vision Sensors	Andreas Suess (OMNIVISION)*
R5.6	Exploiting Alternating DVS Shot Noise Event Pair Statistics to Reduce Background Activity Rates	Brian J Mcreynolds (AFIT/CI, Institute of Neuroinformatics, UZH/ETH Zurich)*; Tobi Delbruck (Nil); Rui Graca (Institute of Neuroinformatics - UZH and ETH Zurich)

Lunch followed by Social Trips

Groups depart for social visits to:

Tour of Stirling Castle

Hill Walk and visit to Glenturret Whisky Distillery & Whisky Tasting

BBQ and Games Evening

Breakfast

Session 6:
Beyond Visible & Scientific Imaging

	Paper	Author & Affiliation
R6.1	Stability and photometric accuracy of CMOS Imaging Detectors: Radiation damage, quantum confinement and the stability of delta-doped surfaces	Michael E Hoenk (Jet Propulsion Laboratory)*
R6.2	5 Minutes Integration Time Deep UV Pixel Development for "Ultrasat" Space Mission	Adi Birman (Tower Semiconductor)*; Omer Katz (Tower Semiconductor); Amos Fenigstein (TowerJazz); Dmitry Veinger (Tower semiconductor); Dmitri Ivanov (Tower Semiconductor); Shay Alfassi (Tower Semiconductor); Shirly Regev (Etesian Semiconductor); et al.
R6.3	Fabrication Of Small Pitch InGaAs Photodiodes Using In-Situ Doping And Shallow Mesa Architecture For SWIR Sensing	Jules Tillement (STMicroelectronics)*
R6.4	Evaluating the theoretical optical performances of colloidal quantum dot films for infrared imaging	Arthur Arnaud (STMicroelectronics)*; bilal chehaibou (STMicroelectronics); Gabriel Mugny (STMicroelectronics Grenoble); loic baudoin (STMicroelectronics Crolles); pierre machut (STMicroelectronics Grenoble); et al.
R6.5	Custom CMOS Image Sensors for Application to Low Light Level Imaging and Use in Extreme Low Light Level Electron Bombarded CMOS Image Sensors	Verle Aebi (EOTech, LLC.)*
R6.6	A Thin-Film Pinned-Photodiode Imager Pixel with Fully Monolithic Fabrication	Joo Hyoung Kim (IMEC)*; Epimitheas Georgitzikis (imec); Minhyun Jin (Dongguk University); Yannick Hermans (imec); Naresh Chandrasekaran (imec); Abu Bakar Siddik (imec); Florian De Roose (imec); Griet Uytterhoeven (Imec); et al.

Coffee Break

Invited Speakers

Prof. Charles Bouman, Purdue University
Jerome Chossat , Technical Fellow, STMicroelectronics

Lunch

Session 7:
Speciality and New Applications

	Paper	Author & Affiliation
R7.1	In Depth Characterization and Radiation Testing of a High Performance Fully Passivated Charge Domain CDTI based CCD-on-CMOS Image Sensor	Antoine Salih Alj (ISAE-SUPAERO / CNES / Thales Alenia Space)*; Marjorie Morvan (ISAE-SUPAERO); Pierre Touron (STMicroelectronics); Francois Roy (STMicroelectronics); Stephane Demiguel (Thales Alenia space); Cedric Virmontois (CNES); Julien Michelot (Pyxalis); Pierre Magnan et al
R7.2	A 200 Stages Bi-directional 2-Phases CCD-on-CMOS Back Side Illuminated Time Delay Integration Image Sensor	Julien Michelot (Pyxalis)*
R7.3	A 316MP, 120FPS, High Dynamic Range CMOS Image Sensor for Next Generation Immersive Displays	Abhinav Agarwal (Forza Silicon (Ametek Inc.))*; Jatin Hansrani (Forza Silicon (Ametek Inc.)); Sam Bagwell (Forza Silicon (Ametek Inc.)); Oleksandr Rytov (Forza Silicon (Ametek Inc.)); et al.
R7.4	Hybrid Visible Imaging and Near-infrared Optical Spectroscopy with Smartphone Image Sensor using Bioinspired Nanostructures	Radwanul H Siddique (Samsung Semiconductor, Inc.)*; Yibing M. Wang (Samsung Semiconductor, Inc.)
R7.5	0.5e- rms Read Noise CMOS Image Sensors and Sub-Electron Image Processing for Night Vision Application	Kwang Bo Cho (BAE Systems)*
R7.6	High-speed Time-Delay-Integration (TDI) Imaging with 2-D SPAD arrays	Daniel Van Blerkom (SWIRLabs)*

Awards & Final Night Dinner

Breakfast

Session 8:
 SPAD Devices

	Paper	Author & Affiliation
R8.1	A 3 μm SPAD Pixel with Embedded Metal Contact and Power Grid on Deep Trench Pixel Isolation for High-resolution Photon-counting	Jun Ogi (Sony Semiconductor Solutions Corporation)*; Fumiaki Sano (Sony Semiconductor Solutions Corporation); Tatsuya Nakata (Sony Semiconductor Solutions Corporation); Yoshiki Kubo (Sony Semiconductor Solutions Corporation); et al.
R8.2	A high PDE and high maximum count rate and low power consumption 3D-stacked SPAD device for Lidar applications	bastien mamdy (STMicroelectronics)*; Bruce Rae (STmicroelectronics); Sara Pellegrini (STmicroelectornics); Mohammed Al-Rawhani (STmicroelectronics); Dominique Golanski (STmicroelectronics); Raul Andres Bianchi (STmicroelectronics)
R8.3	A NIR Enhanced SPAD Fabricated in 110 nm CIS Technology with 78% PDP at 500 nm	Utku Karaca (EPFL)*; Ekin Kizilkan (EPFL); Claudio Bruschini (EPFL); Edoardo Charbon (EPFL)
R8.4	GeSi SPAD for SWIR Sensing and Imaging	Neil Na (Artlux)*
R8.5	Germanium on silicon SPAD 32x32 pixel array in 3D-stacked technology for SWIR applications	younes benhammou (STMicroelectronics)*; Norbert Moussy (CEA-LETI); Dominique Golanski (STMicroelectronics); Francis Calmon (INSA Lyon - INL); Denis Rideau (STMicroelectronics); Sara Pellegrini (STMicroelectronics)
R8.6	Doping Engineering for PDP Optimization in SPADs Implemented in 55-nm BCD Process	Feng Liu (EPFL)*; Claudio Bruschini (EPFL); Myung-Jae Lee (Korea Institute of Science and Technology (KIST)); Edoardo Charbon (EPFL)

Coffee Break

Session 9:
 Time of Flight

	Paper	Author & Affiliation
R9.1	A Half-Pulse 2-Tap Indirect Time-of-Flight Ranging Method with Sub-Frame Operation for Depth Precision Enhancement and Motion Artifact Suppression	ChiaChi Kuo (Tohoku University)*; Rihito Kuroda (Tohoku University, Japan)
R9.2	A 3.5 μm Indirect Time-of-Flight Pixel with In-Pixel CDS and 4-Frame Voltage Domain Storage	Erez Tadmor (onsemi)*
R9.3	A 320x232 LiDAR Sensor with 24dB Time-Amplified and Phase-Revolved TDC	Chin Yin (TSMC)*; Shang-Fu Yeh (Taiwan Semiconductor Manufacturing Company (TSMC)); Chiao-Yi Huang (TSMC); Hon-Yih Tu (TSMC); Meng-Hsiu Wu (TSMC); Tzu-Jui Wang (TSMC); Kuo-Chin Huang (TSMC); Calvin Y Chao (TSMC)
R9.4	A 648 x 484-Pixel 4-Tap Hybrid Time-of-Flight Image Sensor with 8 and 12 Phase Demodulation for Long-Range Indoor and Outdoor Operations	Kamel Mars (Shizuoka University)*; Kensuke Sakai (Shizuoka University); Yugo Nakatani (Shizuoka University); Masashi Hakamata (Shizuoka University); Keita Yasutomi (Shizuoka University); et al.
R9.5	Tap mismatch mitigation of 3 μm 2tap pixels of indirect Time-of-Flight image sensor for high-speed depth mapping	Yuhi Yorikado (Sony Semiconductor Solotions)*; Chihiro Okada (Sony Semiconductor Solutions); Sozo Yokogawa (Sony Semiconductor Solutions); Fumihiko Koga (Sony Semiconductor Solutions)
R9.6	A 1.2Mp indirect-ToF sensor with on-chip ISP for low-power and self-optimization	Seung-Chul Shin (Samsung Electronics)*

Lunch

All depart

Buses depart at 2pm for Edinburgh Airport (arrival 3:15pm) and Edinburgh City Centre (arrival 3:45pm)