5th International Workshop on Image Sensors and Imaging Systems (IWISS2022)

-Frontiers in image sensors based on conceptual breakthroughs inspired by applications-

The workshop is an in-person event, but it can be switched online, depending on the pandemic situation

Sponsored by: Technical Group on Information Sensing Technologies (IST), the Institute of Image Information and Television Engineers (ITE)

Co-sponsored by: International Image Sensor Society (IISS)

Group of Information Photonics (IPG) +CMOS Working Group, the Optical Society of Japan,

Innovative Photonics Evolution Research Center (iPERC)

Date: **December 12 (Mon) and 13 (Tue), 2022**

Venue: Sanaru Hall, Hamamatsu Campus, Shizuoka University

Access: https://www.eng.shizuoka.ac.jp/en_other/access/

Address: 3-5-1 Johoku, Nakaku, Hamamatsu, 432-8561 JAPAN

Official language: English

The latest information on registration, poster submission, and advance program:

http://www.i-photonics.jp/meetings.html#20221212IWISS

Overview: In this workshop, people from various research fields, such as image sensing, imaging systems, optics, photonics, computer vision, and computational photography/imaging, come together to discuss the future and frontiers of image sensor technologies in order to explore the continuous progress and diversity in image sensors engineering and state-of-the-art and emerging imaging systems technologies. The workshop is composed of invited talks and a poster session. A Poster Presentation Award will be given to the selected excellent paper. **Every participant is required to register online by December 5 (Mon), 2022. On-site registration is NOT accepted.** Since the workshop is operated by a limited number of volunteers, we can offer only minimal service; therefore, no invitation letters for visa applications to enter Japan can be issued.

Scope: - Image sensor technologies: fabrication process, circuitry, architectures;
            - Imaging systems and image sensor applications;
            - Optics and photonics: nanophotonics, plasmonics, microscopy, spectroscopy;
            - Computational photography/ imaging;
            - Applications and related topics on image sensors and imaging systems:
             e.g., multi-spectral imaging, ultrafast imaging, biomedical imaging, IoT, VR/AR, deep learning, ...

General Chair: Keiichiro Kagawa (Shizuoka Univ., Japan)

Technical Program Committee (Alphabetical order):

Chih-Cheng Hsieh (National Tsing Hua Univ., Taiwan)   Min-Woong Seo (Samsung Electronics, Korea)

Keiichiro Kagawa (Shizuoka Univ., Japan)   Hiroyuki Suzuki (Gunma Univ., Japan)

Takashi Komuro (Saitama Univ., Japan)   Hisayuki Taruki (Toshiba Electronic Devices &

De Xing Lioe (Shizuoka Univ., Japan)   Storage Corporation, Japan)

Hajime Nagahara (Osaka Univ., Japan)   Franco Zappa (Politecnico di Milano, Italy)

Atushi Ono (Shizuoka Univ., Japan)

<Contact for any question about IWISS2022>

E-mail: iwiss2022@idl.rie.shizuoka.ac.jp (Keiichiro Kagawa, Shizuoka Univ., Japan)

Join and enjoy the workshop!

Online registration for audience:

Registration is necessary due to the limited number of available seats. Please make a registration from the following link. **Registration deadline is December 5 (Mon), 2022**.

[in Japanese]

https://www.ite.or.jp/ken/user/index.php?cmd=participation&tgs_regid=faf9bc5bde5e430962d98b110ccac65c5ddc6ca5718edb7c80089461c48b9cfa

[in English]

https://www.ite.or.jp/ken/user/index.php?cmd=participation&tgs_regid=faf9bc5bde5e430962d98b110ccac65c5ddc6ca5718edb7c80089461c48b9cfa&lang=eng

Registration fee:

Available from the links above.

NOTE: This price is for purchasing the online proceeding of IWISS2022 through the ITE. If you cannot join the workshop due to any reason, no refund will be provided.

Paper submission to the poster session:

Entry your paper at the following URL:

https://www.ite.or.jp/ken/form/index.php?tgs_regid=faf9bc5bde5e430962d98b110ccac65c5ddc6ca5718edb7c80089461c48b9cfa&tgid=ITE-IST&lang=eng&now=20220719133618

 (Use the above English page. DO NOT follow the Japanese instructions at the bottom of the page.)

Paper entry deadline: Oct. 14 (Fri), 2022 (Only title, authors, and short abstract are required)

The acceptance of your paper will be notified by Oct. 21 (Fri)

Manuscript submission deadline: Nov. 21 (Mon), 2022 (2-page English proceeding is required)

One excellent poster will be awarded.

Collaboration with MDPI Sensors Special Issue

https://www.mdpi.com/journal/sensors/special_issues/CMOS_image_sensor

Special Issue on "Recent Advances in CMOS Image Sensor"

Special issue editor: Dr. De Xing Lioe

Paper submission deadline: February 25 (Sat), 2023

The poster presenters are encouraged to submit a paper to this special issue!

Note-1: Those who do not give a presentation in the IWISS2022 poster session are also welcome to submit a paper!

Note-2: Sensors is an open access journal, the article processing charges (APC) will be applied to accepted papers.

Note-3: For poster presenters of IWISS2022, please satisfy the following conditions.

The submitted extended papers to the special issue should have more than 50% new data and/or extended content to make it a real and complete journal paper. It will be much better if the Title and Abstract are different with that of conference paper so that they can be differentiated in various databases. Authors are asked to disclose that it is conference paper in their cover letter and include a statement on what has been changed compared to the original conference paper.

Agenda *Speaker

Day 1 (Dec. 12 (Mon))

9:00-10:00 Registration

10:00-10:10 Opening remarks

Session: Computational Imaging

10:10-10:50 Invited-1

"Coded Two-Bucket Sensors for Active and Passive Imaging"

by *Kyros Kutulakos, Rahul Gulve, Navid Sarhangnejad, Roman Genov (Univ. of Tronto, Canada)

10:50-11:30 Invited-2

"Computational lensless imaging by coded optics"

by *Tomoya Nakamura (Osaka Univ., Japan)

11:30-13:00 Lunch

Session: Plenary

13:00-14:00 Plenary

"Deep sensing --Jointly optimize imaging and processing—"

by *Hajime Nagahara (Osaka Univ., Japan)

14:00-14:20 Break

14:20-15:50 **Poster session** (17 papers)

15:50-16:00 Break

Session: Long-Wavelength Imaging

16:00-16:40 Invited-3

"InGaAs/InP and Ge-on-Si SPADs for SWIR applications"

by *Alberto Tosi, Fabio Signorelli, Fabio Telesca, Simone Riccardo, Enrico Conca（Politecnico Milano (POLIMI), Italy）

16:40-17:20 Invited-4

"Principles and applications of real-time synthetic multi-exposure laser speckle contrast perfusion imaging"

by *Martin Hultman, Ingemar Fredriksson, Marcus Larsson, Tomas Stromberg (Linkoping Univ., Sweden)

17:20-17:30 **Award ceremony**

Day 2 (Dec. 13 (Tue))

9:00-9:30 Registration

Session: Optics and Photonics for Imaging

9:30-10:10 Invited-5

"Near-infrared sensitivity improvement by plasmonic diffraction technology"

by *Nobukazu Teranishi, Atsushi Ono (Shizuoka Univ., Japan)

10:10-10:50 Invited-6

"High-speed/ultrafast holographic imaging using an image sensor"

by *Yasuhiro Awatsuji, Tomoyoshi Inoue (Kyoto Inst. Technol., Japan), Takashi Kakue (Chiba Univ., Japan), Osamu Matoba (Kobe Univ., Japan)

10:50-11:30 Invited-7

"Integration of frequency comb measurement and optical coherence tomography"

by *Yoshio Hayasaki (Utsunomiya Univ., Japan)

11:30-13:00 Lunch

Session: Direct ToF

13:00-13:40 Invited-8

"CMOS SPAD-Based LiDAR Sensors with Zoom Histogramming TDC Architectures"

by Bumjun Kim, Seonghyeok Park, Su-Hyun Han, *Seong-Jin Kim (Ulsan National Inst. of Sci. and Tech. (UNIST), Korea)

13:40-14:20 Invited-9

"Modeling and verification of a photon-counting LiDAR"

by *Sheng-Di Lin, Po-Hsuan Chen, Chun-Hsien Liu, Chia-Ming Tsai, Tsu-Hsien Sang, Gray Lin (National Yang Ming Chiao Tung Univ. (NYCU), Taiwan)

14:20-14:40 Break

Session: Indirect ToF

14:40-15:20 Invited 10

"The most energy-efficiency image sensor architecture: case study for automotive and time-of-flight sensors"

by *Min-Sun Keel, Youngtae Jang, Jonghyuk Woo, Ji Hun Shin, Sejun Kim, Minjong Kim, Kyung-Min Kim, Minwoo Lee, Jinkyeong Heo, Seunghun Yoo, Youngkyun Jeong, Haechang Lee (Samsung, Korea)

15:20-16:00 Invited 11

"What's Next in ToF Imaging: Passive Operation, One-bit Quantization, and Spatiotemporal Superresolution"

by *Miguel Heredia Conde, Faisal Ahmed, Alvaro Lopez Paredes (Univ. Siegen, Germany)

16:00-16:10 Closing remarks

Poster Session:

Poster-01: "A polarization CMOS image sensor with on-pixel polarizer optimized for microwave electric-field imaging" by *Ryoma Okada, Kiyotaka Sasagawa (Nara Institute of Science and Technology (NAIST), Japan）, Maya Mizuno (National Institute of Information and Communications Technology (NICT), Japan), Makito Harut, Hironari Takehara (NAIST, Japan), Hiroyuki Tashiro (NAIST/ Kyushu Univ., Japan), Jun Ohta (NAIST, Japan)

Poster-02: "Snapshot super-resolution time-of-flight imaging by PSF engineering and untrained deep neural-network prior" by *Hodaka Kawachi, Tomoya Nakamura, Yasushi Makihara, Yasushi Yagi (Osaka Univ., Japan)

Poster-03: "Plasmonic polarization color filtering using 1D corrugated metallic thin films"

by *Yusuke Fukaya, Atsutaka Miyamichi, Keiichiro Kagawa, Keita Yasutomi, Shoji Kawahito, Atsushi Ono (Shizuoka Univ., Japan)

Poster-04: "Design of a linkable self-encoding CMOS image sensor for a compact lensless camera with an ultra-wide field of view" by *Fuki Hosokawa, Keiichiro Kagawa (Shizuoka Univ., Japan), Kiyotaka Sasagawa, Jun Ohta(NAIST, Japan), Tomoya Nakamura（Osaka Univ., Japan）

Poster-05: "Random Sequence Modulation of Multiple-Gate of Indirect ToF for Handling Multi-ToF-Camera Interference" by *Luo Wenbin, Takafumi Iwaguchi (Kyushu Univ., Japan),   Hajime Nagahara (Osaka Univ., Japan), Ryusuke Sagawa (AIST, Japan), Hiroshi Kawasaki (Kyushu Univ., Japan)

Poster-06: "Pseudo-direct ToF imaging using a multi-tap macro-pixel CMOS image sensor with oversampled reconstruction" by *Pham Ngoc Anh, Thoriq Ibrahim, Keita Yasutomi, Shoji Kawahito (Shizuoka Univ., Japan), Hajime Nagahara (Osaka Univ., Japan), Keiichiro Kagawa (Shizuoka Univ., Japan)

Poster-07: "Development of a vein imaging system with minimum value operation and scanned stripe pattern projection for contactless vein authentication" by *Sota Nakazawa, Keiichiro Kagawa (Shizuoka Univ., Japan), Takashi Komuro (Saitama Univ., Japan), Kazuya Nakano (Seikei Univ., Japan), Hiroyuki Suzuki (Gunma Univ., Japan)

Poster-08: "Estimation of scattering and chromophore concentration maps by multi-band spatial frequency domain imaging using a two-layer skin model" by *Yuto Shimada, Yu Feng, Chen Cao, Keita Yasutomi, Shoji Kawahito, Keiichiro Kagawa (Shizuoka Univ., Japan)

Poster-09: "Basic Study on Domain Specific Description of Convolution with Sliding FFT" by *Yamato Kanetaka (Nagoya Inst. of Tech. (NIT), Japan）・Yoshihiro Maeda (Tokyo Univ. of Sci. (TUS), Japan), Norishige Fukushima (NIT, Japan)

Poster-10: "Light-induced reliability issue of NMOS using in CMOS image sensor and single-photon avalanche diode" by *Chun-Hsien Liu, Sheng-Di Lin (National Yang Ming Chiao Tung Univ. (NYCU), Taiwan)

Poster-11: "An area efficient readout circuit for CMOS Image Sensor With Lateral Overflow Integration Capacitor" by *Ai Otani, Hiroaki Ogawa (Ritsumeikan Univ., Japan), Ken Miyauchi, Sangman Han, Hideki Owada, Isao Takayanagi (Brillnics, Japan), Shunsuke Okura (Ritsumeikan Univ., Japan)

Poster-12: "A Variable-Resolution SAR ADC with 10-bit Image Capturing Mode and 5-bit Feature Extraction Mode" by *Itsuki Koshiro, Otani Ai, Ogawa Hiroaki, Okura Shunsuke (Ritsumeikan Univ., Japan)

Poster-13: "Cosmos sensor 10 um 64Mpixel Low noise and high dynamic range image sensor for space and scientific applications" by *Jose Segovia, Alberto Villegas, Rafael Dominguez, Loli Pardo, Alex Charlet (Teledyne Anafocus, Spain), Jason McClure, Sony Cheriyan (Teledyne Princeton, USA), Jason Nottingham, Jon Kurvits (Teledyne Photometrics, USA）, Ana Gonzalez (Teledyne Anafocus, Spain)

Poster-14: "Non-invasive non-contact gingival thickness imaging using visible light and near infrared light" by *Ryotaro Mori, Keiichiro Kagawa (Shizuoka Univ., Japan), Jun Tanida (Osaka Univ., Japan), Chizuko Ogata (Osaka Dental Univ., Japan)

Poster-15: "Hydra systems. A set of new ToF image sensors with high performances" by *R Dominguez, Pierre Fereyre, Jose Angel Segovia, Maria Dolores Pardo, Ana Gonzalez, Sergio Morillas, Amanda Jimenez, Gema Valles, Yoann Lochardet（Teledyne e2v, UK）

Poster-16: "Block-wise-controlled Image Sensor with Variable Resolution, Frame rate, and Exposure Time for Scene Adaptive Imaging" by Kohei Tomioka, Toshio Yasue, Kodai Kikuchi, Takenobu Usui, Kazuya Kitamura (NHK STRL, Japan), Shoji Kawahito (Shizuoka Univ., Japan)

Poster-17: "Noise Reduction Based on Quantization-Aware Multiple Image Averaging" by *Seishi Takamura （Hosei Univ., Japan）