IST 2022

June 21-23, 2022
Kaohsiung Taiwan
Hybrid

IEEE International Conference on IMAGING SYSTEMS & TECHNIQUES

Sponsored by:

IEEE Instrumentation and Measurement Society, and TC 19 Technical Committee on Imaging Systems

in conjunction with the

IEEE International School of Imaging

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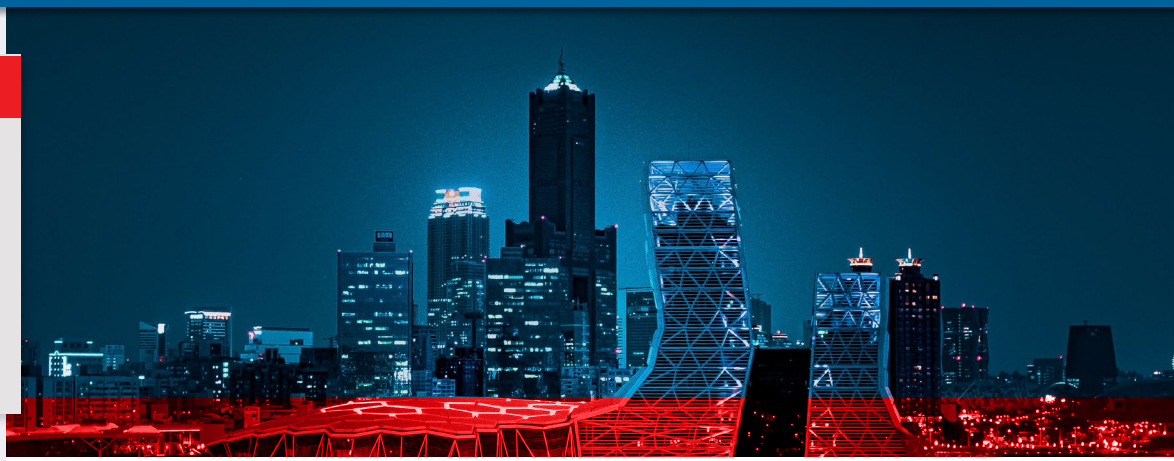

IMPORTANT DATES

April 1, 2022
Full Paper Submission Deadline

April 15, 2022
Notification of Acceptance

May 10, 2022
Full Paper Deadline

Manuscripts must be prepared in 4 to 6 pages in IEEE 8.5 x 11 format. The IST Proceedings are indexed in the WEB of Science and Scopus and will be submitted to IEEE Xplore for publication. Submitted papers may not have been previously published in or under consideration for publication in another journal or conference. Manuscripts should be submitted as PDF files via EDAS.

The authors of the accepted and presented conference papers are welcome to submit their technically extended papers for possible publication in a Special Issue of **IEEE TIM (IEEE Transactions on Instrumentation and Measurement, IF 3.067)** as well in other prestigious peer-reviewed journals. All the submitted papers are peer-reviewed follow the regular process.

Please visit:

ist2022.ieee-ims.org
(Will be Avalible Soon)

Invitation from the Organizers

On behalf of the Technical and Local Committee of the 2022 IEEE International Conference on Imaging Systems and Techniques (IST 2021) and IEEE International School on Imaging, we welcome you to the hybrid IST conference, 21-23 June, Kaohsiung Taiwan.

Historically, this is the sixteenth consecutive year, following the successful IST events held previously in Stresa, Italy (2004), Niagara Falls, Canada (2005), Minori, Italy (2006), Krakow, Poland (2007), Chania, Greece (2008), Shenzhen, China (2009), Thessaloniki, Greece (2010), Penang Island, Malaysia (2011), Manchester, UK (2012), Beijing, China (2013), Santorini, Greece (2014), Macau, China (2015), Chania, Greece (2016), Beijing, China (2017), Krakow, Poland (2018), Abu Dhabi, UAE (2019), New York (virtual) (2021) where experts from all over the world meet to trigger an in-depth discussion of imaging methodologies and its applications shaping the future, and identifying emerging imaging trends.

This year, scientists and engineers from all over the world meet to explore the design principles, development and applications of new imaging technologies and computer visualization techniques. The use of machine learning and artificial intelligence to analyze and interpret imaging data is rapidly changing the global economy, experiencing an unparalleled integration of science and technology with artificial intelligence and big data; let us see this event as unique opportunity not only to exchange and disseminate knowledge but also bridge multidisciplinary areas like engineering and science with health science, robotics, quantum neuromorphic cognition, exploration of Space and Industry 4.0.; generating new knowledge while establishing global collaborative multidisciplinary opportunities, by tightening collaborations among industry, academia, and healthcare industry.

We would like to thank the TC-19 on Imaging Measurements and Systems Technical Committee, IEEE Instrumentation and Measurement Society, Prof. Chi-Hung Hwang and the local Organizing Committee, the IST Organizing and Steering Committees, for their dedicated efforts towards the organization of the event. Special thanks Conference Catalysts, LLC, Administrators of the IST and the IEEE School of Imaging, for their outstanding and enthusiastic efforts to administrate and contribute to the success of these two major events.

We are cordially inviting you to join and honor with your presence the 2022 IEEE International Conference on Imaging Systems and Techniques (IST2022) and the IEEE International School on Imaging. This is a unique opportunity for the advancement of knowledge, I addition, it paves the way to generate exciting global collaborative opportunities among industry, academia, and healthcare professionals.

George K. Giakos, Fellow of the IEEE
General Chairman of the IEEE IST Conference
New York, United States

Dr. Chi-Hung Hwang, IST Local Chair
National Applied Research Laboratories
Taiwan

IST 2022 Technical Scope

The objectives of IST 2022 are but not limited to:

Cognitive Vision and Artificial Intelligence

- Artificial intelligence (AI) Techniques mimicking the brain
- Human cognition and computer vision
- Bioinspired vision systems and techniques
- Neuromorphic detection and imaging
- Quantum computing and Machine Learning
- Quantum computing image processing
- Neuroscience and artificial intelligence-based computer vision
- Image recognition and artificial intelligence (AI)
- Neural network machine learning
- Predictive analytics and classification
- Big data and data science
- Image processing
- Imaging Informatics and bioinformatics

Robotic Vision and Industry 4

- Machine vision, inspection, and artificial intelligence
- Cognitive vision systems
- Autonomous navigation, drones and vehicles
- Bioinspired robotic vision systems
- 2-d, 3-d, 4-d imaging
- Light Illumination architectures
- Medical surgical robotics
- Block chain and distributed robotic vision sensing
- Human visual system-based Imaging
- Mobile Robotic Vision
- Logistics and e-commerce

Medical Diagnostics & Imaging to Biology

- Bioinformatics and big data analytics
- Immunohistochemical digital imaging
- Translational imaging and theranostics
- Molecular imaging and biology, Omics, biomarkers, metabolites
- Virtual pathology
- Pharmaco-imaging in drugs and medicine, drug characterization
- Omics instrumentation and imaging

Medical Image Modalities

- Digital Radiography
- Computed Tomography (CT)
- Magnetic Resonance Imaging (MRI)
- Nuclear Imaging-SPECT-PET
- Ultrasound Imaging
- Optical coherence tomography (OCT)
- Optical polarimetric reflectance spectroscopy
- Multispectral imaging
- Narrow band imaging
- Laser acoustics
- Raman scattering
- Fluorescence Imaging
- Surgical guidance imaging
- Lasers for Imaging and Theranostics
- Augmented Reality and intraoperative navigation in malignancies
- Real-time diagnosis and visualization of tumor margins

On chip signal or image processing

- Image sensors for 3D imaging
- Bio-inspired image sensor

High-end image sensors

- Neuromorphic imaging
- High speed
- Large format
- Ultra low power
- Ultra low noise
- Very high dynamic range
- On-chip processing for smarter sensors

Medical and Industrial Image Visualization Analysis and Processing

- Physics of image formation
- Image phenomenology and perception
- Global and local image analysis and processing
- Mutiresolution image analysis
- Machine learning and computer visualization
- Image registration and restoration techniques
- Clustering techniques for feature extraction and segmentation
- Filtering and Image segmentation techniques
- Neural networks and deep learning
- Bioinformatics and big data

Imaging Devices and Techniques

- Detector physics
- Imaging sensors and detectors
- Cameras, microscopy, spectroscopy, displays
- Device miniaturization
- Computer graphics and augmented reality
- Machine learning, and processors
- Data acquisition systems and techniques
- Electric impedance tomography (EIT)
- Electrical Resistivity Tomography (ERT)
- Inverse scattering tomography techniques
- Image processing and pattern recognition
- Artificial intelligence and imaging

Emerging imaging trends

- Web-based remote diagnosis
- Internet of the Things (IoT) and Imaging Autonomous navigation
- Cloud and edge computing, Imaging, and mobile Platforms
- Cybersecurity and Imaging
- Smart Cities and Imaging

Image sensors assessment and novel implementations or applications

- Hyperspectral image sensors or camera
- Image sensors for computational imaging
- Image sensors for automotive applications
- Image sensors used in integrated networks (internet of things)
- Image sensors for drones and autonomous vehicles
- Sensor fusion

Remote Sensing & Unmanned Autonomous Vehicles

- Remote sensing, ladars & lidars
- Autonomous aerial and underwater imaging systems
- Bioinspired robotic vision systems
- Electromagnetic scattering
- Advanced space instruments and satellite imaging
- Sensors for aerospace applications
- Image processing and pattern recognition
- Spectral registration
- High dimensional data reduction in spectral bands

IST 2022 Technical Scope

The objectives of IST 2022 are but not limited to:

Imaging Tools

- Texture Analysis
- Image quality assessment Image restoration
- Super-resolution Imaging
- Human visual system based Imaging
- Compressive sensing for imaging
- Image enhancement

Multimedia Retrieval in Spectral Imaging

- Content-based retrieval in hyper/ multi-spectral domain
- Summarization tools in hyper/multispectral domain
- Relevance feedback techniques to assist experts in taking complex decisions
- Behavioral analysis and actions recognition for complex engineering applications
- 4D/5D image reconstruction
- Semantic representation and content enrichment

Mobile Platforms, Cloud Computing, Computer Vision & Cybersecurity

- Embedded imaging, mobile and communication applications
- Neuromorphic computing

Real life Imaging Applications & Challenges

- Homeland security, surveillance, inspection and monitoring
- Industrial Inspection and material characterization
- Semiconductor wafers, solar cells, nanomaterials, biomaterials and composites
- Pharmaceutical and food processing vision inspection system
- Image phenomenology and processing-active-passive sensors and illumination technologies
- Urban planning, civil engineering monitoring & transportation
- Environmental monitoring & early detection of natural hazards
- Cultural heritage applications

About Kaohsiung

Kaohsiung, also known as Taiwan's Maritime Captial, is the largest industrial city and a thriving international metropolis of southern Taiwan. Under the regulating effects of the marine climate, Kaohsiung is generally sunny and enjoys pleasant weather year-round. The urban landscapes of Kaohsiung include the 85 Sky Tower, the Ferris wheel of the Kaohsiung Dream Mall, the Kaohsiung Arena, the National Kaohsiung Center for the Arts (WeiWuYing), and Kaohsiung Harbor. Kaohsiung has a large number of shopping streets, night markets and newly developed leisure parks, such as the Pier-2 Art Center, E-DA Theme Park, Metropolitan Park, the Kaohsiung Museum of Fine Arts, and Taroko Park. In Kaohsiung, you can enjoy the scenic mountains, ocean views, and rivers, as well as a port, cultural, and historic attractions, including the Love River, Shoushan, Sizihwan, Lotus Pond, Cijin, and the Old City of Zuoying. The Kaohsiung Metro and railways connect almost all of the shopping streets and sighting attractions that make visitors easy to visit.

As the biggest municipality city in Taiwan, the natural attractions of Kaohsiung are abundant. Visitors can take hiking at Tengjhih Forest Recreation Area, enjoy numerous butterflies sounded at Maolin National Scenic Park, enjoy hot-spring at Baolai, and have city and harbor bird-view from Shoushan, or meet Taiwan macaque at Shoushan nature park. Visitors can even plan to have a trip to the Yushan National Park at the northeastern tip of the city.

Visitors can explore various cultures in Kaohsiung; due to the inhabitants are from different ethnics, including Hokkien and Hakka communities, the Pingpu, Tsou, Rukai, Bunun, and Paiwan indigenous tribes, and military community cultures. Visitors can experience the beauty of nature and savor fine cuisine, or head to the nearby Hakka village of Meinong to experience traditional oil paper umbrella art. The Neimen Songjiang Battle Array, the Fo Guang Shan Buddhist monastery in Dashu, and Holy Rosary Cathedral (the oldest Catholic church in Taiwan) at downtown display the richness religious cultures of Taiwan. Of course, the attendees can enjoy seafood at Cijin, and the well-known night markets complete the scene for a thoroughly satisfying trip.

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AI and Imaging Applications

Dr. Phillip L. Reu
Standardization of Image Correlation Method

Prof. Jinchang Ren
Hyperspectral imager and its applications

Dr. Carlito S. Ponseca Jr.
THz imaging system/ technologies for bio- and PV- applications

Prof. George K. Giakos
Quantum Neuromorphic Computing and Space Applications

KEY-NOTE LECTURERS

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IBM, USA
Lecture: Quantum Computing

Prof. Rui (Ranger) Fan,
Tongji University, China
Lecture: Computer Vision and Machine Learning for Driving Scene Understanding

Prof. Antonios Gasteratos,
Democritus University of Thrace, (DUTH), Greece
Lecture: Recent trends in Visual Loop Closure Detection for Autonomous Behaviours

Prof. Michalis Zervakis,
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Lecture: TBA

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