

## CALL FOR PAPERS

### IMPORTANT DATES

**May 1, 2022**

Full Paper Submission Deadline

**May 15, 2022**

Notification of Acceptance

**May 30, 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.

High-quality, technically extended papers will be considered, following a peer review process, for possible publication in a Special Issue of IEEE Open Journal of Instrumentation and Measurement (IEEE OJIM) as well in other prestigious peer-reviewed journals.

Please visit:

[ist2022.ieee-ims.org](http://ist2022.ieee-ims.org)



### Invitation from the Organizers

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

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, in 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

**The 2023 IST will take place in June, in Copenhagen, Denmark, organized  
by Prof. Evangelos Boukas, DTU-Technical University of Denmark**

# 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

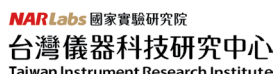
- » Homeland security, surveillance, inspection and monitoring
- » Industrial inspection and material characterization
- » Semiconductor wafers, solar cells, nanomaterials, biomaterials and composites
- » Pharmaceutical and food processing vision inspection system
- » Image phenomenology and processing-active-passive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

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Sponsored by IEEE Instrumentation & Measurement Society, and TC-19 Technical Committee on Imaging Signals and Systems in conjunction with the IEEE International School of Imaging



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*Universiti Sains Malaysia, Malaysia*

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**Prof. George K. Giakos,**  
*Quantum Neuromorphic  
Computing in Space*

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

**Aaron Fenster,**  
*3D ultrasound technology*

**Dr. Phillip L. Reu,**  
*Standardization of Image  
Correlation Method*

**Prof. Jinchang Ren,**  
*Hyperspectral imager and its  
applications*

**Prof. Takayoshi Shimura,**  
*Ultra-High Speed camera*

**Prof. Sos Agaian,**  
*Artificial Neural Networks*

## KEY-NOTE LECTURERS INTERNATIONAL SCHOOL OF IMAGING

**Prof. Frank Hsu,**  
*Fordham University, USA*  
**Lecture: Preference Detection  
Using Combinatorial Fusion**

**Dr. Giorgos Kollias,**  
*IBM, USA*  
**Lecture: Quantum Computing**

**Dr. Rui Fan,**  
*Tongji University, China*  
**Lecture: Computer Vision and  
Machine Learning for Driving  
Scene Understanding**

**Prof. Michalis Zervakis,**  
*Technical University of Crete, Greece*

**Lecture: Advances in Medical  
Imaging and Neuroimaging**

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

**Prof. Luay Fraiwan,**  
*Abu Dhabi University, UAE*  
**Lecture: mHealth systems based  
on mobile thermal imaging**

**Dr. Tannaz Farrahi,**  
*University of Colorado Boulder, USA*  
**Lecture: Development of  
Superconducting-Insulating  
Superconducting (SIS) junctions for  
THz Imaging**

**Prof. Lazaros Nalpantidis,**  
*DTU-Technical University of  
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**Lecture: Autonomous Robotic  
Systems in Labor-intensive  
Industries**

**Prof. Li-Wei Kang,**  
*National Taiwan Normal University  
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**Lecture: Image Restoration: From  
Sparse Coding to Deep Learning**

**Prof. Andrzej Skalski,**  
*University of Science and  
Technology, Poland*

**Lecture: Mixed and Augmented  
Reality in Medicine**

**Prof. Matteo Pastorino &  
A. Randazzo,**  
*University of Genoa, Italy*  
**Lecture: Novel Optimization and AI-  
based approaches to microwave  
diagnostics**

<sup>1</sup>Prof. Manish Kumar Bajpai,  
<sup>2</sup>Prof. Koushendra Kumar Singh  
<sup>1</sup>Indian Institute of Information  
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Manufacturing, India; <sup>2</sup>National  
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**Lecture: Application of Fractional  
Calculus in Image Processing**

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## ANNOUNCEMENTS

A poster exhibition of STEM students will take place during the Conference. This STEM exhibition will address presentation of student artifacts, through capstone projects (senior design projects), from different countries. Best Student presentation awards will be issued. Details will be released soon. Student abstracts after peer review process will be included to *IEEE Xplore*

**The 2023 IST will take place in Shanghai, China,  
organized by leading Academic Institutions.**



## Call for Papers

### IEEE Open Journal of Instrumentation and Measurement (IEEE OJIM)

#### Special Section on

#### Imaging System and Techniques

You are welcome to submit your paper presented at the 2022 IEEE International Conference on Imaging Systems and Techniques to this special issue. Your extended version must meet the following requirements:

- (1) Upload a Cover Letter, explaining that the paper is an extended version of a previously-published proceedings paper.
- (2) If any co-authors present in the proceedings version have been removed in the journal version, the reason for the removal must be explained in the Cover Letter. Additionally, the removed co-authors must sign the same Cover Letter, stating that they agree to be removed from the journal version.
- (3) Upload a document with item type "List of Extensions" that explains exactly what has been extended from the proceedings version. Please note that OJ-IM only considers "Technical Extensions"; i.e., the extension must present new technical thing(s), not just more explanation, etc.
- (4) Upload a copy of the proceedings paper with item type "Copy of Proceedings Papers".
- (5) Cite and refer to your proceedings paper in the extended journal version. Additionally, in the introduction, add a sentence which declares that this paper is an extension of the proceedings paper, or makes reuse of the proceedings paper, or some language similar to that.
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#### Deadlines

**Submission:** Oct. 1, 2022  
**First decision:** Oct. 25, 2022  
**Final decision:** Jan. 5, 2023  
**Publication Volume:** 2023

For more info and submission instructions, please visit OJIM's official website: <http://ojim.ieee-ims.org/>

#### Guest Editors:

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