2024 NIST/IEEE Conference on Computational Imaging Using Synthetic Apertures (CISA)

National Institute of Standards and Technology | Boulder | Colorado | 20-23 May 2024

Call for Papers

Seeing Beyond Limits

The IEEE Signal Processing Society, the IEEE Synthetic Aperture Standards Committee and the IEEE Synthetic Aperture Technical Working Group, together with the National Institute of Standards and Technology (NIST) enthusiastically invite you to the scenic NIST campus in Boulder, Colorado for a unique gathering of researchers and engineers engaged in cutting-edge research on computational imaging and sensing using synthetic apertures (SAs). The term SA refers generically to a discrete measurement scheme together with an inverse problem solution that yields imaging or sensing performance better than what the hardware system is inherently capable of, e.g., wider field-of-view and higher angular resolution. An SA may sample propagating wavefields or environmental parameters in the signal domain via linear motion of an antenna or transducer, as in synthetic aperture radar (SAR), sonar (SAS), or channel sounding. Alternatively, an SA may sample in the k-space domain via different look angles around an object or scene, as in computed tomography, spotlight SAR, or Fourier ptychography. Lastly, an SA may be constructed from a sparse array of sensors as in radiometry, seismology, or radio astronomy. The front end of an SA may be a conventional antenna, acoustic transducer, or a quantum sensor, such as a Rydberg atom sensor, in advanced implementations. CISA will highlight advances in the theoretical development, engineering practice, and standardization of all aspects of SA imaging and sensing. Suggested topics for CISA are listed below.

Important Dates

Special session proposals due: *February 29*
Initial 2-page summary submissions due: *February 29*
CCSI submissions due: *February 29*
Tutorial proposals due: *February 29*
Acceptance notification: *March 15*
Camera-ready 4+1-page paper due: *April 19*

Radar: Automotive SAR, mmWave and THz SAR, polarimetric SAR, ISAR, 3-D imaging, High-dimensional feature processing using tensors

Sonar: Micronavigation and position uncertainty, Bathymetry, Wideband regimes

Optics: Phase retrieval, Ptychography, Holography, Coded diffraction imaging, Coded aperture imaging, Wirtinger flow, Deep learning techniques

5G: Channel sounding, Over-the-air calibration, MIMO antenna testbeds, Intelligent reflecting surfaces, Near-field beam focusing

Seismology: Wave migration and localization techniques

Inverse problems: Deconvolution and hardware de-embedding, Neuromorphic computing methods

Data-driven signal processing: SAR focusing techniques

Magnetic resonance imaging: Image reconstruction from under-sampled measurements

Ultrasound: Flow and velocity estimation

Distributed sensors: Networked coherent radars, sonars

Power beaming: Wireless power transfer to UAVs

Radiometry and remote sensing: 5G signal interference

Quantum receivers: Rydberg atom sensors, Lithium-niobate piezoelectric sensors

Integrated sensing and communications: Coherent UAV swarms

Radio astronomy: Low-noise receivers, Satellite interference mitigation

Point cloud processing: LiDAR, 4D mmWave radar in robotics, autonomous driving

Model-based image reconstruction: Regularization

Prospective authors should visit https://2024.ieeecisa.org/ for more details and to submit manuscripts. All manuscripts must adhere to IEEE formatting guidelines and accepted papers will appear in IEEE Xplore. The 2024 CISA conference will be an in-person event and authors must attend to present their papers live at NIST. For additional questions, please send email to info@2024.ieeecisa.org to contact the co-chairs; Alexandra Artusio-Glimpse, Paritosh Manurkar, Samuel Berweger, Peter Vouras, and Kumar Vijay Mishra.