TECHNICAL PROGRAM/EXHIBITION GUIDE

SPIE. DEFENSE+ COMMERCIAL SENSING

13–17 April 2025
Gaylord Palms Resort &
Convention Center
Orlando, Florida, USA

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SPIE. DEFENSE+ COMMERCIAL SENSING

THE EVENT FOR SENSOR RESEARCH AND TECHNOLOGIES TO ENHANCE CAPABILITIES FOR INDUSTRIAL, SECURITY, AND GOVERNMENT APPLICATIONS

- Cutting-Edge Research
- Exhibition
- Industry Program
- Training and Education

Conferences and Courses: 13–17 April 2025
Exhibition: 15–17 April 2025
Gaylord Palms Resort & Convention Center
Orlando, Florida, USA

Experience the energy of SPIE Defense + Commercial Sensing

Get ready to enjoy real conversations, hear the latest breakthroughs, and make important connections in person. Hear cutting-edge research in sensors, infrared, laser systems, spectral imaging, radar, lidar, autonomous systems, and other findings from the community.

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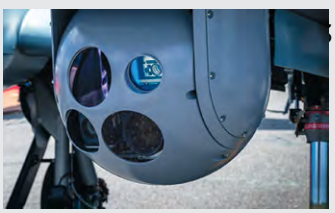
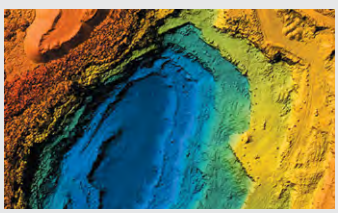
Conference track: Materials and devices
PAGE 16
Presentations that showcase IR materials, image sensors, photon counting, energy harvesting, and quantum technologies. The applications include wearables, cybersecurity, information processing, energy storage, and drones.



Conference track: Imaging and analytics
PAGE 17
Presentations on spectral imaging, computational image processing, metrology, and 3D imaging. Applications include security and defense, climate monitoring, big data, deep learning, machine vision, target detection, and tracking.



Conference track: Advanced sensing and imaging
PAGE 18
Presentations featuring research on IR and thermal imaging, fiber optic sensors, lidar, radar, laser radar, x-ray detection and imaging, advanced optics for imaging, and image processing using AI/ML. Applications include novel defense and security systems for intelligence, surveillance, and reconnaissance, infrastructure monitoring, energy, autonomous vehicles, and remote sensing.

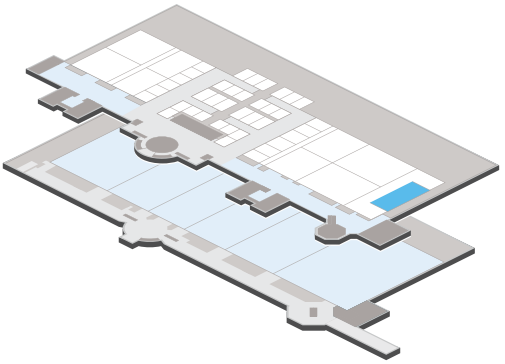
Conference track: Next-generation sensor systems and applications
PAGE 19
Presentations highlighting cutting-edge research focused on emerging technologies for specific applications such as autonomous systems, CBRNE, agriculture and food safety, CPS/IoT, and more.

Application tracks—PAGE 18

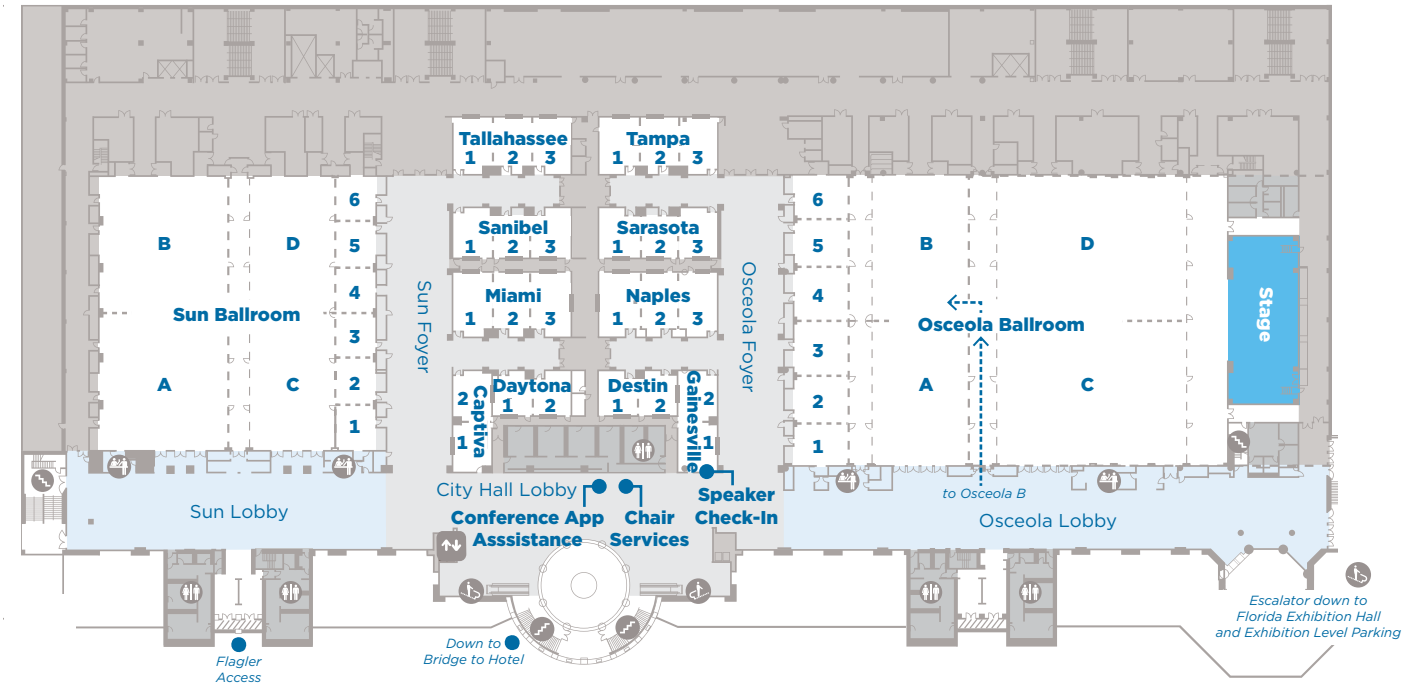
Application tracks enable attendees to explore presentations across conferences and plan their event schedules around the topic of interest. Use the SPIE App for marking which presentations you want to see.

GAYLORD PALMS RESORT & CONVENTION CENTER

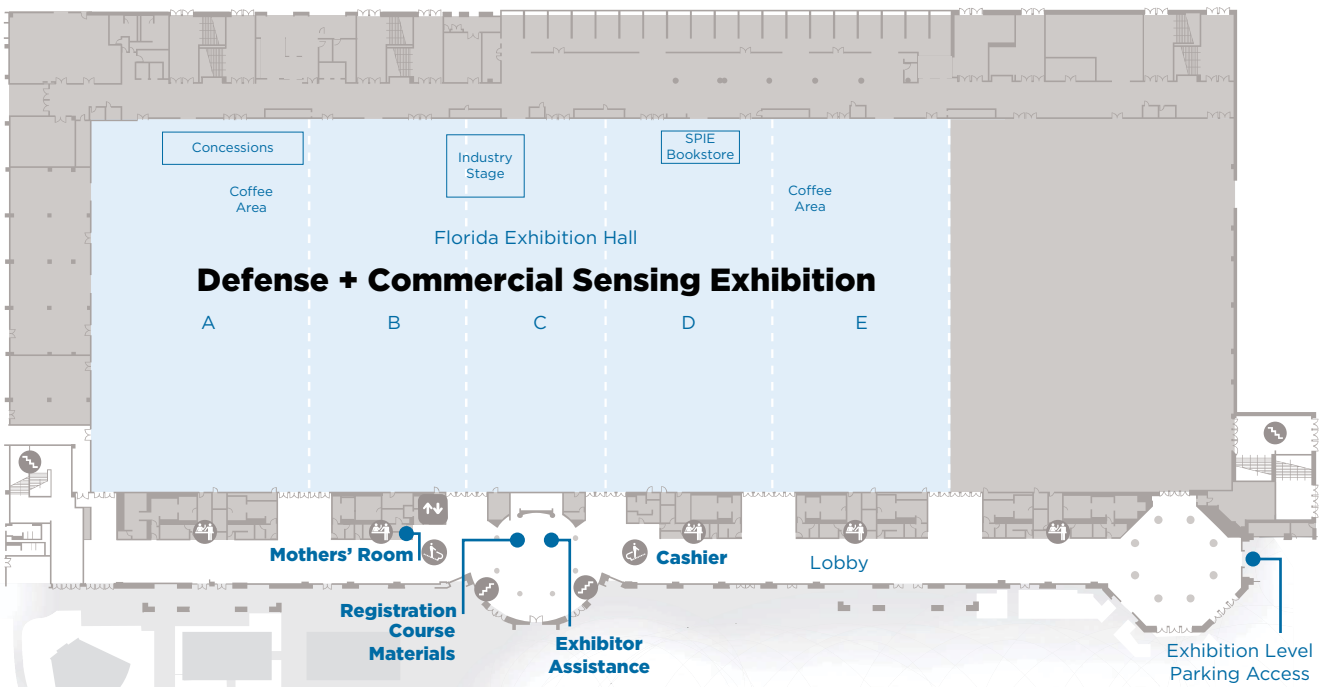
BALLROOM LEVEL
Sun and Osceola Ballrooms



KEY
Restrooms · Stairs · Registration Desks
Elevator · Escalator · Service Areas



FLORIDA EXHIBITION LEVEL
Level One



Badge pick up and registration hours

Location: Gaylord Palms, Exhibition Level, Hall C Foyer

Sunday, 13 April	7:45 AM–5:00 PM
Monday, 14 April	7:15 AM–5:00 PM
Tuesday, 15 April	7:30 AM–5:00 PM
Wednesday, 16 April	7:45 AM–5:00 PM
Thursday, 17 April	7:45 AM–2:00 PM

SPIE Cashier

Location: Gaylord Palms, Hall C Lobby, Exhibition Level
Open during registration hours

Registration payments:

If you are planning to register onsite, please do so at the Need to Register laptop station

Your credit card payment will be processed during registration.

If you wish to pay with cash or check, you will be directed to the Cashier after you have completed registration.

If you have already registered and wish to add a course, workshop, or special event, you may do this online after you login to your SPIE account.

Receipt and Certificate of Participation
Preregistered attendees who need an SPIE-stamped receipt or any attendee who needs a Certificate of Participation may obtain them at the Cashier.

Badge Corrections
Badge corrections can be made at the Cashier. Please remove your badge from its holder and mark your badge with the necessary changes before approaching the counter.

Speaker Check-in and Preview Station

Location: Gaylord Palms, Gainesville, Ballroom Level

Sunday, 13 April	2:00 PM to 5:00 PM
Monday, 14 April	7:15 AM to 5:00 PM
Tuesday, 15 April	7:30 AM to 5:00 PM
Wednesday, 16 April	7:45 AM to 5:00 PM
Thursday, 17 April	7:45 AM to 5:00 PM

All speakers must stop at Speaker Check-In to upload and preview their slide presentation files at least two hours before their scheduled session, or the day before if you present in the first session of the next day. Speakers are not able to present using their own devices. All conference rooms are equipped with a laptop, projector, screen, lapel microphone, and laser pointer.

SPIE will record the audio and screen content of all presentations. Recordings will be published in the Proceedings of SPIE on the SPIE Digital Library.

Internet Access

Complimentary WiFi access is provided in meeting rooms, conference room level lobbies, and in the exhibition hall. Instructions will be posted onsite.

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OPTIMAX

SPIE health and safety products

Stop by registration to pick up complimentary face masks, hand sanitizer, and other safety products all free from SPIE.

SPIE Conference app information

Location: Gaylord Palms, City Hall Lobby, Ballroom Level

Our SPIE App developer will be onsite and available to answer any questions on its use or navigation and how to get the best user experience. We welcome your feedback.

This useful tool allows you to search and browse the program, special events, participants, exhibitors, courses, and more. It is free and available for iPhone and Android users. Download the SPIE App: spie.org/apps

APP SPONSORED BY:

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SPIE Bookstore

Location: Gaylord Palms, Exhibition Hall

Tuesday, 15 April	10:00 AM to 5:00 PM
Wednesday, 16 April	10:00 AM to 5:00 PM
Thursday, 17 April	10:00 AM to 2:00 PM

Stop by the SPIE Bookstore to browse the latest SPIE Press Books. While there, get a t-shirt or educational toy to bring home to the family.

Credit and debit cards only; no cash.

SPIE Course Materials

Location: Gaylord Palms, Hall C Lobby, Exhibition Level

Sunday - Wednesday . . . . . .during registration hours.

Browse course offerings or learn more about SPIE courses available in portable formats such as online and customizable, group training courses.

SPIE Luggage and Coat Check

Complimentary luggage, package, and coat storage is available in the hotel lobby.

Onsite Parking

Show your conference badge to the Gaylord Palms parking attendant to receive a 30% discount ($26.60 instead of $38 per day) to self-park.

Business Center and FedEx Office

Location: Gaylord Palms, Mezzanine Level

Daily . . . . . 7:00 AM to 7:00 PM

Printing services available.

Services also include photocopying, faxing, and shipping. Office supplies available.

Child Care Services

Kid's Nite Out 1-800-696-8105

Offers in-room sitter services and more.

SPIE does not imply an endorsement nor recommendation of these services. They are provided on an "information only" basis for your further analysis and decision. Other services may be available.

Gender Neutral Restrooms

Gender neutral restrooms available. Location: Hall A Lobby, Exhibition Level

Quiet Room

Location: Gaylord Palms Hotel and Convention Center, Clearwater Room, Mezzanine Level
Open during registration hours

The Quiet Room is intended for silent meditation, reflection, or prayer. No mobile device or computer use or food/beverages are allowed.

Lost and Found

Location: SPIE Cashier (Gaylord Palms,Hall D Lobby, Exhibition Level)
Open during registration hours

Found items will be kept at the SPIE Cashier and is only available during registration hours. At the end of the meeting, all found items will be turned over to hotel security.

Food and Beverage Services

Concessions: Exhibition Hall B

Tuesday and Wednesday . . . . . 11:00 AM - 2:00 PM
Thursday . . . . . 11:00 AM - 1:30 PM

Complimentary Coffee:

Monday	7:15 AM - 4:00 PM	City Hall Lobby
Tuesday & Wednesday	7:30 AM - 9:30 AM	City Hall Lobby
Tuesday & Wednesday	10:00 AM - 4:00 PM	Exhibition Hall
Thursday	7:30 AM - 9:30 AM	City Hall Lobby
Thursday	10:00 AM - 2:00 PM	Exhibition Hall
Thursday	2:00 PM - 4:00 PM	City Hall Lobby

COFFEE BREAKS SPONSORED BY:

PLENARY EVENTS

Defense + Commercial Sensing plenary sessions will feature speakers presenting on a wide range of topics from across the defense, academic, and industrial sectors. Plenary sessions are open to all paid conference attendees.

Symposium Plenary

14 April 2025 • 5:30 PM - 6:20 PM
Osceola Ballroom C, Ballroom Level

5:30 PM - 5:40 PM:

Welcome and opening remarks

Ann Marie Raynal
Sandia National Labs. (USA)
2025 SPIE Symposium Chair

Ravi Ravichandran
BAE Systems (USA)
2025 SPIE Symposium Chair

Introduction

Raja Suresh
ASU Research Enterprise (ASURE) (USA)
2025 SPIE Track Chair

5:40 PM - 6:20 PM:

Bring the future faster

Jason E. Bartolomei
Brigadier General, United States Air Force,
Air Force Research Lab. (USA)

The United States and its allies face challenges posed by an increasingly aggressive, dynamic threat environment and the relentless pace of technological change. These challenges not only threaten our dominance in air and space but if left unchecked could upend our way of life. In these times of change, what remains constant is preeminence in researc—the first essential of air and space power. The game-changing work of the Air Force Research Laboratory is critical to win the future.

Symposium Panel on Space Sensing: Emerging Topics, Needs, and Crossover Technology

15 April 2025 • 8:30 AM - 10:00 AM
Osceola Ballroom C, Ballroom Level

Crossover sensing and autonomy technologies are pushing satellite systems in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Moderator
David Ellis
Director of Strategic Development
BAE Systems Inc., Space & Mission Systems (USA)

Panelists

Gabe Mounce
Space Force Accelerators
Air Force Research Laboratory (USA)

Michael Foster
Chief Data Engineer
Raft (USA)

Kevin Flesher
Senior Director
Maxar Intelligence (USA)

Tarek A. Elgohary
Associate Professor
University of Central Florida (USA)

Mark Keremedjiev
Mission Director
Planet Labs PBC (USA)

INDUSTRY EVENTS

Attend sessions focused on the business side of the optics and photonics industry, including defense and security applications

Thermosense Vendor Session

14 April 2025 • 1:00 PM - 5:00 PM
Tampa 2, Ballroom Level

This session provides opportunity for exhibitors to highlight their newest technologies to the infrared industry and technical audience prior to the opening of the exhibition. A paid technical badge or exhibitor technical pass is required.

Presentations are (listed in order of presentation):

HGH Systèmes Infrarouges (Booth 1111)

Enhancing accuracy with HGH IRCOL test benches: a turnkey solution for any EO equipment
Arnaud Louboutin, Position: Sales & Product Manager – EOT Division

Chroma Technology Corp. (Booth 1324)

Optical filters: shift happens – how to control your shift
Chris Karp, Position: Director of Sales

Omega Optical Holdings LLC (Booth 910)

Low surface roughness infrared coatings
Person TBA, Position: Chief Marketing Officer

RICOR USA, Inc. (Booth 1204)

Market trends in cryocoolers for IR detectors
Victor (Vicky) Segal, Position: VP Marketing & Sales RICOR, CEO RICOR USA

Teledyne FLIR LLC (Booth 1001)

The new FLIR MIX
Jerry Beeney, Position: Director of Global Business Development

IRnova AB (Booth 716)

Njord MW, SWaP 1280x1024@10µm T2SL 3-5µm detectors
Eric Costard, Position: CTO

Telops Inc. (Booth 705)

Breakthrough infrared technologies: Next-gen HDR and compact hyperspectral systems
Vince Morton, Position: Business Development Manager – US DoD

Thales Cryogenics BV (Booth 722)

Thales cryogenics coolers for complete range of reliable application
Jimmy Wade, Position: USA Sales Manager

MKS Ophir (Booth 804)

Empowering UAV EO systems through innovative low-SWaP high-performance IR optical designs
Lawrence JJ Conboy, Position: North American Sales Manager

G&H (Gooch & Housego) (Booth 811)

Continuous zoom lenses for SwIR & MwIR (thermal imaging) applications
Jacob Oh, Position: Business Development Director

SCD USA Infrared, LLC (Booth 909)

SCD: dominating the IR spectrum
Shai Fishbein, Position: VP Business Development, Products & Marketing

CI Systems, Inc. (Booth 700)

Advances in CI's product line of gimbals
Dario Cabib, Position: CTO; or Ilya Koshkin, Position: Director, CI Systems USA Branch

Defense + Commercial Sensing Exhibition

Exhibition Hall

15 April 2025. . . . . 10:00 AM - 5:00 PM
16 April 2025. . . . . 10:00 AM - 5:00 PM
17 April 2025. . . . . 10:00 AM - 2:00 PM

Visit SPIE Defense + Commercial Sensing Exhibition on its second day. Connect with customers, clients, and system providers from around the world to find mission-critical and innovative solutions in components, instruments, and more.

Industry Keynote: Advancing DFOS: Bridging Warfighter and Commercial Sensing Innovation

15 April 2025 • 11:00 AM - 11:30 AM
Industry Stage, Exhibition Level

Distributed Fiber Optic Sensing (DFOS) is revolutionizing environmental monitoring, offering unparalleled capabilities in structural health assessment, acoustic detection, and beyond. This presentation introduces the DFOS Community of Interest (COI)—a consortium of over 20 organizations from government, industry, and academia—aimed at accelerating collaboration and innovation in DFOS technologies.

The discussion will focus on how the DFOS COI fosters rapid technology transition, aligns industry advancements with warfighter requirements, and drives cross-sector breakthroughs in sensing and artificial intelligence integration. Attendees will gain insights into emerging opportunities, pathways for engagement, and the role of DFOS in shaping the future of defense and commercial sensing solutions.

Speaker
Joshua Carter
Photonics and Optics Engineer
Naval Surface Weapons Center
Dahlgren Division (USA)

Solve Your Workforce Crisis: How to Engage with Photonics Education Ecosystem

15 April 2025 • 1:00 PM - 2:30 PM
Industry Stage, Exhibition Level

This panel, featuring senior leaders from academia and prime contractors, will discuss current education and training initiatives, government funding for workforce programs, and the expectations from DoD employers. The session will conclude with an interactive Q&A, providing insights into workforce challenges and opportunities.

Moderator
Natalia Chekhovskaya
Director
LASER-TEC (USA)
Indian River State College (USA)

Panelists

Zack Tarter
Deputy Director, Missiles & Fire Control
Lockheed Martin (USA)

Carolyn McMorran
Assistant VP of Continuing Education
Valencia College (USA)

Mike McKee
Associate Director, Undergraduate Program
CREOL, Univ. of Central Florida (USA)

Cade Bradley
Electro-Optical Subsystems Chief Technologist
Raytheon (USA)

Industry Keynote: Securing a Resilient & Reliable Energy Grid with Long Duration Energy Storage

15 April 2025 • 2:45 PM - 3:15 PM
Industry Stage, Exhibition Level

This presentation highlights the significance of Long Duration Energy Storage (LDES) in achieving energy security and other important considerations, outlines the current barriers to widespread adoption, and introduces the LDES National Consortium – a forum through which stakeholders across the LDES ecosystem can convene to identify barriers, determine potential synergies, and collaboratively develop and implement strategies necessary to achieve LDES technology commercialization within the next decade.

Speaker
Luke McLaughlin
Senior R&D Mechanical Engineer
Sandia National Laboratories (USA)

Quantum Sensors: Revolutionizing PNT and Biomedicine

15 April 2025 • 3:30 PM - 4:30 PM
Industry Stage, Exhibition Level

Quantum sensors are poised to transform industries by enabling unprecedented precision and reliability in challenging environments. This panel will explore the application of quantum sensing technologies in Position, Navigation, and Timing (PNT), addressing critical needs in defense and commercial sectors, as well as their emerging role in advancing biomedical diagnostics and monitoring. Special attention will be given to the role of advanced light sources in enhancing sensor performance and the development of low-SWAP (size, weight, and power) miniaturized solutions for practical deployment.

Moderator
Constanza M. Vidal Bustamante
Quantum Technology & National Security Fellow
Center for New American Security (USA)

Panelists

Amir Ghods
Vice President of Photonics
Mesa Quantum Systems (USA)

Patrick Leisching
Chief Technology Officer
iThera Medical GmbH (Germany)

Mike Larsen
Quantum Science Architect
Northrop Grumman (USA)

Lasers in the International Spotlight: Focus on Global Security

16 April 2025 • 10:30 AM - 12:00 PM
Industry Stage, Exhibition Level

This panel will convene international experts to discuss the current and potential future uses of laser technology for security and defense purposes, performance and design needs of the community, and the challenges to be addressed in providing robust, reliable solutions.

Moderator
Robert Walker
Vice President of Strategy and Business Development
Leonardo (USA)

Panelists

Sandra Biedron
Director of Knowledge Transfer, Center for Bright Beams (USA)

Tiago Ortega
Vice President of Research and Development
EOS Space Systems (Australia)

Kenny McCormick
Head of Capability, Electro-Optics
Leonardo (United Kingdom)

James Murray
Senior Director and Technical Fellow
Areté Associates (USA)

Microelectronics Commons: From Prototype to Production

16 April 2025 • 1:30 PM - 3:00 PM
Industry Stage, Exhibition Level

Microelectronics Commons is an Office Under Secretary of Defense for Research and Engineering, OUSD(R&E), program establishing a network of regional technology Hubs acting on a shared mission: to expand the nation's global leadership in microelectronics and reduce reliance on foreign supply chains. The Commons program enables technology development and laboratory to fabrication (lab-to-fab) transitions to domestic manufacturers in the areas of 5G/6G, Artificial Intelligence Hardware, Commercial Leap-Ahead, Electromagnetic Warfare, Secure Edge / Internet of Things Computing, and Quantum Technologies. Commons Hub members will provide brief overviews, highlight their hubs are accelerating lab to fab prototypes, and discuss the path to production transitions in a joint panel discussion.

Session Organizers

Timothy Morgan
Microelectronics Commons
Technical Director
NSWC Crane (USA)

Dustin J. Decker
Microelectronics Commons
Deputy Technical Director
NSWC Crane (USA)

Moderator
Stephanie Lin
Vice President
NSTXL, Microelectronics Commons (USA)

Panelists

Stephen Crago
Director
California Dreams Hub (USA)

John F. Muth
Director
CLAWS Hub (USA)

Matt Casto
Chief Technology Officer
MMEC Hub (USA)

Mark Halfman
Director
NEMC Hub (USA)

Nicholas Fahrenkopf
Technical Director
NORDTECH Hub (USA)

Michael Bilyeu
Ecosystem Technical Program Manager
ARI (USA)
SCMC Hub (USA)

Krishnendu Chakrabarty
Chief Technology Officer
SWAP Hub (USA)

SPIE Government Affairs Update

16 April 2025 • 3:30 PM - 4:00 PM
Industry Stage, Exhibition Level

Come hear an update on the latest actions by the Trump administration impacting the optics and photonics community, SPIE advocacy efforts, and the next iteration of Horizon Europe.

Speakers

Jennifer O'Bryan
Director, Government Affairs
SPIE (USA)

Matthew Jepsen
Government Affairs Manager
SPIE (USA)

Silicon Photonics for Defense and National Security

17 April 2025 • 10:30 AM - 11:30 AM
Industry Stage, Exhibition Level

In this session, industry panelists will discuss a variety of silicon photonics applications that could yield a decisive advantage for defense and national security applications. Silicon photonics holds great potential for positioning, navigation, and timing as well as for sensing, remote imaging, machine vision, and more. Industry panelists will discuss their companies' innovations as well as the challenges and opportunities for this fast-developing suite of technologies. After their presentations, panelists will discuss and answer the audience's questions.

Moderator
William G. Schulz
Managing Editor, *Photonics Focus* magazine
SPIE (USA)

Panelists

Semiconductor Photonics for Quantum Sensing Applications

Amirhossein Ghods
Vice President of Photonics
Mesa Quantum Systems (USA)

Germanium-Silicon Single-Photon Avalanche Diode: The Last Missing Piece of Silicon Photonic Detectors

Neil Na
Co-founder, Chief Scientist, CTO
Artilux (USA)

Heterogeneous Integration and Quantum Dot Lasers for Silicon Photonics

Simone Šuran Brunelli
Senior Materials Scientist
Aeluma, Inc. (USA)

Photonic Accelerators for Network-edge Intelligence

Volker J. Sorger
Rhines Endowed Professor of Semiconductor Photonics
Dept. of Electrical and Computer Engineering, Univ. of Florida (USA)

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TOGETHER, WE THRIVE.

Stay connected with our global community.

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TECHNICAL EVENTS

Colleagues gather to explore topics in depth. Attend workshops, poster sessions, panel discussions, and training opportunities.

Advancing Distributed Fiber Optic Sensing: Innovations, Applications, and Strategic Collaboration

14 April 2025 • 9:00 AM - 12:15 PM

This workshop will showcase developments in distributed fiber optic sensing (DFOS) across defense, commercial, and research applications.

Three-Dimensional Imaging, Visualization, and Display Conference Keynote

14 April 2025 • 9:30 AM - 10:00 AM | Sanibel 1, Ballroom Level

Computational three-dimensional fluorescence imaging through scattering media by the transport of intensity equation

Osamu Matoba
Kobe University (Japan)

Computational optical imaging is applied in biology and neuroscience because of its ability to rapidly acquire the activity of multiple objects that exist in three dimensions with a wide field of view. We have been developing 3D fluorescence imaging techniques by combining quantitative phase imaging based on digital holography or the transport of intensity equations, with numerical propagation calculations. In particular, overcoming scattering is essential for future research to achieve deep observation in biological tissues. In this presentation, we will introduce 3D fluorescence imaging, photon counting imaging, and imaging through scattering medium using computational optical imaging.

Panel Discussion: Machine Learning for Automatic Target Recognition

14 April 2025 • 10:20 AM - 12:20 PM | Osceola 3, Ballroom Level

Join this discussion to hear how traditional rule-based approaches to automatic target recognition are giving way to dynamic data-driven methodologies empowered by artificial intelligence.

Moderators:
Asif Mehmood, Joint Artificial Intelligence Center (USA)
Matt Reismann, Bedrock Research (USA)

Tutorial: Federated Learning for Decentralized and Privacy-Preserving Machine Learning

14 April 2025 • 11:30 AM - 12:30 PM | Osceola 2, Ballroom Level

This 1-hour-long tutorial will provide an in-depth introduction to FL, covering its key principles, architectures, and the advantages it offers in preserving privacy while enabling robust machine learning. We will explore practical applications in various domains, highlight key challenges such as communication efficiency and security, and discuss recent advances in federated optimization and aggregation techniques.

Image Sensing Technologies Conference Keynote I

14 April 2025 • 1:30 PM - 2:00 PM | Miami 2, Ballroom Level

The DARPA OpTIm program

Mukund Vengalattore, Defense Advanced Research Projects Agency (USA)

Infrared imaging at the quantum limits The DARPA Optomechanical Thermal Imaging (OpTIm) program seeks to develop a novel modality of low-SWaP quantum-limited infrared detection. Building upon proof-of-concept studies and detailed noise analyses, the OpTIm device concept amalgamates high performance optomechanical sensors, quantum-limited all-optical readout techniques, and spectrally resolved metamaterial-based IR absorbers to realize several order-of-magnitude improvements in both IR sensitivity and detection speed. I will give a brief overview of the OpTIm program concept, the over-arching goals of this program, and a summary of innovations that have resulted from the program thus far. I will also describe the numerous technological applications and opportunities that are engendered by the novel capabilities of OpTIm imaging systems.

Panel Discussion: LLMs for Information Fusion

14 April 2025 • 1:50 PM - 4:50 PM | Osceola 1, Ballroom Level

Join the Signal Processing, Sensor/Information Fusion, and Target Recognition conference for this informative panel discussion on large language models for information fusion.

Image Sensing Technologies Conference Keynote II

14 April 2025 • 2:50 PM - 3:20 PM | Miami 2, Ballroom Level

Scalable approaches to quantum information

Mukund Vengalattore, Defense Advanced Research Projects Agency (USA)

Science Harnessing unique attributes of quantum systems such as entanglement, quantum parallelism, and measurement backaction for computation and modeling of complex systems has been a decades-long grand challenge of the quantum community. Despite substantial progress in this direction, attaining computational quantum advantage for DoD-relevant problems has remained elusive. One of the key stumbling blocks has been inadequate scalability of quantum computing architectures and the exorbitant resource overhead required for conventional paradigms of quantum state preparation, error correction, and fault tolerance. I will overview ongoing efforts within the DARPA Defense Sciences Office (DSO) to develop scalable approaches to dense qubit encoding, resource-efficient forms of error correction, and the creation of novel quantum many-body states of computational or metrological utility.

Thin Film Lithium Niobate Workshop

15 April 2025 • 1:00 PM - 5:00 PM
Tallahassee 2, Ballroom Level

Thin film lithium niobate (TFLN) material has potential in photonics and electro-optics to advance a variety of applications from optical data communications, autonomous vehicle navigation, signal processing, and quantum applications. Various efforts are currently progressing in manufacturing and use of the material. The Microelectronics Commons (Commons) Quantum Technology Technical Area Leads are hosting a TFLN workshop to better understand the landscape, efforts, and how best to collaborate with limited resources. This half day workshop will start with an introductory presentation by a TFLN researcher on the material, challenges, breakthrough, and a high-level manufacturing process. It will be followed by three panel discussions each kicked off by a presenter on materials and processes, use cases, scaled manufacturing capabilities, as well as other important aspects. The panel discussion will be presented with panel introductions and a few starting questions by the moderator follow by Q&A and discussions with the audience. The moderator(s) will conclude the workshop with short remarks and summary of action items and key takeaway.

1:00 PM – 1:45 PM:

High performance integrated photonics based on thin film lithium niobate (TFLN)

Marko Lončar
Brigadier General, Harvard University and
Hyperlight Corporation (USA)

1:45 PM – 2:05 PM:

United States domestic lithium niobate supply chain and opportunities

Matt Whittaker
Gooch & Housego (USA)

2:05 PM – 2:40 PM: Panel Discussion: Materials scaling and manufacturing requirements and challenges

Moderator: To be determined

Panelists:
Matt Whittaker, Gooch & Housego (USA)
Steve McKeown, Air Force Research Laboratory (USA)
Piyush Shah, Apex Microdevices (USA)

2:40 PM – 2:55 PM: Coffee Break

2:55 PM – 3:15 PM:

HyperLight's Thin-Film Lithium Niobate (TFLN) Platform: Unlocking the Future of Integrated Photonics

Amirmahdi Honardoost
Hyperlight Corporation (USA)

3:15 PM – 3:50 PM:

Panel Discussion: Integration and device design challenges and requirements

Moderator: To be determined

Panelists:
Amirmahdi Honardoost, Hyperlight (USA)
Paul Juodawlkis, MIT Lincoln Laboratory (USA)
Stefan Preble, Rochester Institute of Technology (USA)
Dirk Englund, Massachusetts Institute of Technology (USA)

3:50 PM – 4:05 PM: Coffee Break

4:05 PM – 4:25 PM: Applications of TFLN in clocks, quantum sensing, and quantum networks

Kartik Srinivasan
National Institute of Standards and Technology and Joint Quantum Institute (USA)

4:25 PM – 5:00 PM: Panel Discussion: Photonics applications requirements

Moderator: To be determined

Panelists:
Kartik Srinivasan, National Institute of Standards and Technology (USA)
Kang Tan, IonQ (USA)
Samuel Knarr, L3Harris (USA)
Nicholas Usechak, Air Force Research Laboratory (USA)

Panel Discussion and Poster Session: Algorithms for Synthetic Aperture Radar Imagery

15 April 2025 • 2:50 PM - 5:00 PM | Tampa 2, Ballroom Level

Join the Algorithms for Synthetic Aperture Radar Imagery conference for a poster session and panel discussion.

Infrared Technology and Applications Conference Keynote

15 April 2025 • 3:30 PM - 4:10 PM | Osceola B, Ballroom Level

Microelectronics Commons is the Department of Defense portion of the CHIPS and science act to focus on departmental priorities that benefit the warfighter. Collectively, the six technical areas, 5G/6G, electromagnetic warfare, quantum, secure edge/internet of things, artificial intelligence hardware and commercial leap ahead, contribute toward improving the capability of sensing platforms. The keynote will focus on progress within Commons and how the lab-to-fab microelectronic prototyping benefits the sensing community.

DoD's microelectronics for the defense and commercial sensing ecosystem

Timothy Morgan
Naval Surface Warfare Ctr. Crane Div. (USA)

Panel Discussion: Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping

15 April 2025 • 4:00 PM - 5:30 PM
Tallahassee 3, Ballroom Level

Join the Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping conference for this informative panel discussion.

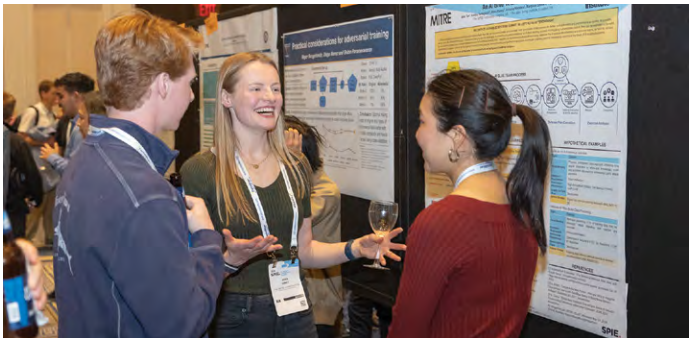
Poster Session

15 April 2025 • 5:30 PM - 7:00 PM
Sun Room 4, Ballroom Level

Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the SPIE Defense + Commercial Sensing posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM

Poster authors, view poster presentation guidelines and set-up instructions at **http://spie.org/DCSPosterGuidelines**.



Panel Discussion and Poster Session: Algorithms for Synthetic Aperture Radar Imagery

16 April 2025 • 2:50 PM - 5:00 PM | Tampa 2, Ballroom Level

Join the Algorithms for Synthetic Aperture Radar Imagery conference for a poster session and panel discussion to talk about topics from the days presentations.

Panel Discussion: Detecting and Deterring Misinformation and Deception

16 April 2025 • 4:20 PM - 5:20 PM | Miami 1, Ballroom Level

Under the umbrella of Disruptive Technologies in Information Sciences, we host the panel for detecting/deterring misinformation and deception focusing on disseminating education on counteracting erroneous information, verifying evidence, reporting.

Panel Discussion: Cryocoolers

17 April 2025 • 2:40 PM - 3:30 PM | Osceola B, Ballroom Level

Join this panel comprising top-level users and customers of cryogenic technologies. The event will adopt a freeform format, with the Q&A segment carefully coordinated to enhance the mutual commercial and technical benefits for all involved parties.

Moderator:
Carl S. Kirkconnell, President, West Coast Solutions (USA)

Panelists:
Oğuz Altun, Director, ASELSAN A.S. (Turkey)
Ted Conrad, Teledyne FLIR LLC (USA)
Eric Costard, CTO, IRnova AB (Sweden)
Nathan Greenwood, Lockheed Martin Corp., Santa Barbara Focalplane (USA)
Ingo Rühlich, AIM Infrarot-Module GmbH (Germany)
Victor Segal, RICOR Cryogenic & Vacuum Systems (USA)
Christophe Vasse, Thales LAS France SAS (France)
Alexander Veprik, CryoTech Ltd. (Israel)

NETWORKING AND COMMUNITY EVENTS

Connect with colleagues in variety of ways throughout the week. Interactive sessions give you the opportunity to network, learn, and discuss your work with optics and photonics professionals from around the world. Advance your network with purpose and build your community.

SPIE Fellow and Senior Member Luncheon

14 April 2025 • 12:00 PM - 1:00 PM
Sun Ballroom A, Ballroom Level

SPIE Fellow and Senior Member attendees are invited to this engaging networking lunch. This luncheon is for any attendees who have been named a Fellow or Senior Member of SPIE.

All-Symposium Welcome Reception

14 April 2025 • 6:30 PM - 8:00 PM | Coquina Lawn

Join your colleagues for food and beverages as we welcome each other to SPIE Defense and Commercial Sensing 2025.

LGBTQ+ Social

15 April 2025 • 7:00 PM - 8:00 PM
Castillo de San Marcos Fort, Atrium Level

Join us to socialize and network with other LGBTQ+ attendees and allies. Everyone is welcome.

Women's Networking Social

16 April 2025 • 3:00 PM - 4:00 PM
Castillo de San Marcos Fort, Atrium Level

Join us for an informal network social elevating and celebrating the women in our field. Everyone is welcome.

Expo Social Hour

17 April 2025 • 1:00 PM - 2:00 PM

Join us for a fun end to the week at the Thursday Social on the exhibition floor.

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COATINGS FOR OPTICS

E.R. PRECISION OPTICAL

CONFERENCE SCHEDULE

13 April 2025	14 April 2025	15 April 2025	16 April 2025	17 April 2025
	Symposium Plenary 5:30 PM - 6:20 PM Osceola Ballroom C, Ballroom Level *See page 7 for details.*	**Symposium Panel on Space Sensing: Emerging Topics, Needs, and Crossover Technology** 8:30 AM - 10:00 AM Osceola Ballroom C, Ballroom Level *See page 7 for details.*		
Materials and Devices — Program track chair: **Nibir K. Dhar,** Virginia Commonwealth Univ. (USA)				
		Conference 13448: **Advanced Photon Counting Techniques XIX,** Chair: Mark A. Itzler; Joshua C. Bienfang; K. Alex Miami 3, Ballroom Level		
	Conference 13449: **Next-Generation Spectroscopic Technologies XVII,** Chairs: Luisa T. M. Profeta; Steven M. Barnet Tallahassee 2, Ballroom Level			
	Conference 13450: **Energy Harvesting and Storage: Materials, Devices, and Applications XV,** Chairs: Peter Bermel; Naresh C. Das; Zunaid Omair Miami 3, Ballroom Level			
	Conference 13451: **Quantum Information Science, Sensing, and Computation XVII,** Chairs: Michael Hayduk; Michael L. Fanto; Carlos M. Torres Jr. Tampa 3, Ballroom Level			
			Conference 13452: **Laser Technology for Defense and Security XX,** Chairs: Mark Dubinskii; Mark S. Zediker Tallahassee 2, Ballroom Level	Conference 13453: **Window and Dome Technologies and Materials XVIII,** Chair: W. Howard Poisl Naples 2, Ballroom Level
	Conference 13454: **Image Sensing Technologies: Materials, Devices, Systems, and Applications XII,** Chairs: Nibir K. Dhar; Achyut K. Dutta; Sachidananda R. Babu Miami 2, Ballroom Level			
		Poster Session 5:30 PM - 7:00 PM **Sun Room 4, Ballroom Level** *See page 14 for details.*		

SYMPOSIUM CHAIRS

Ann Marie Raynal
Sandia National Labs. (USA)

Ravi Ravichandran
BAE Systems (USA)

SYMPOSIUM CO-CHAIRS

Tien Pham
The MITRE Corporation (USA)

Doug Droege
L3Harris (USA)

13 April 2025	14 April 2025	15 April 2025	16 April 2025	17 April 2025
	Symposium Plenary 5:30 PM - 6:20 PM Osceola Ballroom C, Ballroom Level *See page 7 for details.*	**Symposium Panel on Space Sensing: Emerging Topics, Needs, and Crossover Technology** 8:30 AM - 10:00 AM Osceola Ballroom C, Ballroom Level *See page 7 for details.*		
Imaging and Analytics — Program track chair: **David W. Messinger,** Rochester Institute of Technology (USA)				
	Conference 13457: **Multimodal Image Exploitation and Learning 2025,** Chairs: Sos S. Agaian; Vijayan K. Asari; Stephen P. DelMarco; Colleen P. Bailey; Sabah A. Jassim Captiva 1, Ballroom Level	Conference 13455: **Algorithms, Technologies, and Applications for Multispectral and Hyperspectral Imaging XXXI,** Chairs: Miguel Velez-Reyes; David W. Messinger Captiva 1, Ballroom Level		
		Conference 13456: **Algorithms for Synthetic Aperture Radar Imagery XXXII,** Chairs: Edmund Zelnio; Frederick D. Garber Tampa 2, Ballroom Level		
	Conference 13458: **Real-Time Image Processing and Deep Learning 2025,** Chairs: Nasser Kehtarnavaz; Mukul V. Shirvaikar Osceola Ballroom A, Ballroom Level			
	Conference 13459: **Synthetic Data for Artificial Intelligence and Machine Learning: Tools, Techniques, and Applications III,** Chairs: Kimberly E. Manser; Christopher L. Howell; Raghuveer M. Rao; Celso De Melo; Keith F. Prussing Sarasota 3, Ballroom Level			
	Conference 13460: **Machine Learning from Challenging Data 2025,** Chairs: Panagiotis (Panos) Markopoulos; Bing Ouyang; George Sklivanitis Osceola 2, Ballroom Level		Conference 13462: **Dimensional Optical Metrology and Inspection for Practical Applications XI,** Chairs: Kevin G. Harding; Song Zhang; Jae-Sang Hyun; Beiwen Li; Andrés G. Marrugo Sanibel 3, Ballroom Level	Conference 13461: **Geospatial Informatics XV,** Chairs: Kannappan Palaniappan; Gunasekaran Seetharaman; John M. Irvine Osceola 1, Ballroom Level
	Conference 13463: **Automatic Target Recognition XXXV,**Chairs: Kenny Chen; Riad I. Hammoud; Timothy L. Overman Osceola 3, Ballroom Level			
			Conference 13464: **Pattern Recognition and Prediction XXXVI,** Chairs: Mohammad S. Alam; Vijayan K. Asari Tallahassee 3, Ballroom Level	
	Conference 13465: **Three-Dimensional Imaging, Visualization, and Display 2025,** Chairs: Bahram Javidi; Xin Shen; Arun Anand Sanibel 1, Ballroom Level			
		Poster Session 5:30 PM - 7:00 PM **Sun Room 4, Ballroom Level** *See page 14 for details.*		

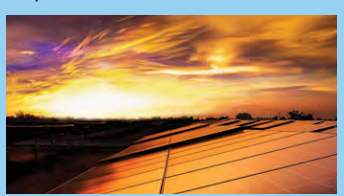
Event Schedule continued on next page

CONFERENCE SCHEDULE

13 April 2025	14 April 2025	15 April 2025	16 April 2025	17 April 2025
	Symposium Plenary 5:30 PM - 6:20 PM Osceola Ballroom C, Ballroom Level *See page 7 for details.*	**Symposium Panel on Space Sensing: Emerging Topics, Needs, and Crossover Technology** 8:30 AM - 10:00 AM Osceola Ballroom C, Ballroom Level *See page 7 for details.*		
Advanced Sensing and Imaging — Program track chair: **Raja Suresh,** ASU Research Enterprise (ASURE) (USA)				
	Conference 13466: **Advanced Optics for Imaging Applications: UV through LWIR X,** Chairs: Jay N. Vizgaitis; Peter L. Marasco; Jasbinder S. Sanghera Naples 1, Ballroom Level	Conference 13467: **Optical Waveguide and Laser Sensors IV,** Chairs: Robert A. Lieberman; Glen A. Sanders; Michael P. Buric Osceola 6, Ballroom Level		
		Conference 13468: **Infrared Imaging Systems: Design, Analysis, Modeling, and Testing XXXVI,** Chairs: David P. Haefner; Gerald C. Holst Osceola Ballroom A, Ballroom Level		
	Conference 13469: **Infrared Technology and Applications LI,** Chairs: Gabor F. Fulop; Michael H. MacDougal; David Z. Ting Osceola Ballroom B, Ballroom Level; Wed. Tampa 2, Ballroom Level			
	Thermosense Vendor Session, Chairs: Beate Oswald-Tranta, Giovanni Ferrarini Tampa 2, Ballroom Level	Conference 13470: **Thermosense: Thermal Infrared Applications XLVII,** Chairs: Giovanni Ferrarini; Peter Spaeth; Fernando López Naples 1, Ballroom Level		
	Conference 13471: **Radar Sensor Technology XXIX,** Chairs: Abigail S. Hedden; Gregory J. Mazzaro Sanibel 3, Ballroom Level; Wed. Tampa 2, Ballroom Level			
			Conference 13472: **Laser Radar Technology and Applications XXX,** Chairs: Gary W. Kamerman; Lori A. Magruder; Monte D. Turner Osceola 2, Ballroom Level	
		Poster Session 5:30 PM - 7:00 PM **Sun Room 4, Ballroom Level** *See page 14 for details..*		

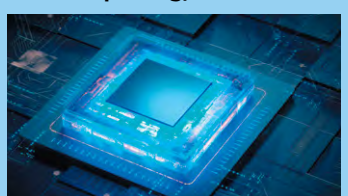
Application tracks

Application tracks enable attendees to group and explore presentations in the conference programs to more easily plan their event schedule around the topic of interest. Application track filters span across all conferences at an SPIE event. The ability to group presentations has the reciprocal benefit of helping authors' presentations be more easily found. See website for a full listing of presentations in each of these tracks: **spie.org/dcs**



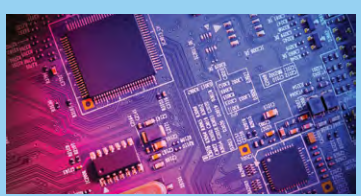
Sustainability

Papers that highlight the use of optics and photonics for renewable energy, natural resource management, sustainable and green manufacturing, and greenhouse gas mitigation in support of the UN's Sustainable Development Goals.



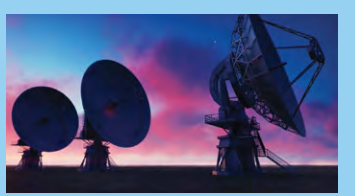
AI/ML

Papers that highlight the use of artificial intelligence, machine learning, and deep learning to create and implement intelligent systems across multiple sectors, technologies, and applications.



Microelectronics

Papers that highlight advances in materials, design, fabrication, integration, and applications of silicon or compound semiconductor microelectronics for use in the security and defense sectors and the commercial marketplace.



Space

Papers that highlight utilization of photonics in space or ground segment components, payloads, platforms, and sensor data exploitation for use in satellite constellations, communications, space situational awareness, and derived information products.

13 April 2025	14 April 2025	15 April 2025	16 April 2025	17 April 2025
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Next Generation Sensor Systems and Applications — Program track chair: **Latasha Solomon,** DEVCOM Army Research Lab. (USA)				
	Conference 13473: **Artificial Intelligence and Machine Learning for Multi-Domain Operations Applications VII,** Chairs: Peter J. Schwartz; Myron E. Hohil; Benjamin Jensen; Brian Henz Osceola 5, Ballroom Level			
	Conference 13474: **Autonomous Systems: Sensors, Processing, and Security for Ground, Air, Sea, and Space Vehicles and Infrastructure 2025,** Chairs: Michael C. Dudzik; Stephen M. Jameson; Theresa J. Axenson Osceola 6, Ballroom Level			
	Conference 13475: **Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping X,** Chairs: J. Alex Thomasson; Christoph Bauer Tallahassee 3, Ballroom Level			
	Conference 13476: **Assurance and Security for AI-enabled Systems 2025,** Chairs: Joshua D. Harguess; Nathaniel D. Bastian; Teresa L. Pace Osceola 4, Ballroom Level			
		Conference 13477: **Unmanned Systems Technology XXVII,** Chairs: Paul L. Muench; Robert Diltz; Raja Suresh Sarasota 1, Ballroom Level		
	Conference 13478: **Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Sensing XXVI,** Chairs: Jason A. Guicheteau; Christopher R. Howle; Tanya L. Myers Naples 2, Ballroom Level			
	Conference 13479: **Signal Processing, Sensor/Information Fusion, and Target Recognition XXXIV,** Chairs: Ivan Kadar; Erik P. Blasch; Lynne L. Grewe; Bhashyam Balaji; Thia Kirubarajan Osceola 1, Ballroom Level			
	Conference 13480: **Disruptive Technologies in Information Sciences IX,** Chairs: Misty Blowers; Bryant T. Wysocki; Russell D. Hall Miami 1, Ballroom Level			
	Conference 13481: **Smart Biomedical and Physiological Sensor Technology XXII,** Chairs: Brian M. Cullum; Eric S. McLamore; Pietro Strobbia Sarasota 1, Ballroom Level		Conference 13482: **Ocean Sensing and Monitoring XVI,** Chairs: Weilin Hou; Linda J. Mullen; Alexander Ignatov Osceola 4, Ballroom Level	
			Conference 13483: **Sensors and Systems for Space Applications XVIII,** Chairs: Genshe Chen; Khanh D. Pham Sarasota 3, Ballroom Level	
		Poster Session 5:30 PM - 7:00 PM Sun Room 4, Ballroom Level *See page 14 for details.*		

COURSE SCHEDULE

Courses complement and expand your Defense + Commercial Sensing experience. Take advantage of this great opportunity to meet face-to-face with an expert instructor and a group of people with similar goals and challenges. See SPIE cashier or register online.

Price key: SPIE Member | Student Member | Non-Member

13 April 2025	14 April 2025	15 April 2025	16 April 2025	17 April 2025
SC014 • Day 1 **Introduction to Optomechanical Design** Instructor: Daniel Vukobratovich, Raytheon Missile Systems 8:30 AM - 5:30 PM $1585 | $848 | $1870 USD	SC014 • Day 2 **Introduction to Optomechanical Design** Instructor: Daniel Vukobratovich, Raytheon Missile Systems 8:30 AM - 5:30 PM $1585 | $848 | $1870 USD	SC1071 **Understanding Diffractive and Meta-Optics** Instructor: Yakov G. Soskind, Coherent Photonics, LLC 8:30 AM - 5:30 PM $885 | $512 | $1030 USD	SC003 **Practical Optical System Design and Engineering** Instructor: Richard N. Youngworth, Riyo LLC 8:30 AM - 5:30 PM $855 | $500 | $1000 USD	
SC067 **Testing and Evaluation of E-O Imaging Systems** Instructor: David P. Haefner, DEVCOM C5ISR 8:30 AM - 5:30 PM $920 | $526 | $1065 USD	SC015 **Fastening Optical Elements with Adhesives** Instructor: John G. Daly, Vector Engineering 1:30 PM - 5:30 PM $525 | $342 | $605	SC1327 **Optical Turbulence and Laser Beam Propagation** Instructor: Italo Toselli, TurbOttica, LLC 8:30 AM - 5:30 PM $855 | $500 | $1000 USD	SC1232 **Introduction to LIDAR for Autonomous Vehicles and AR/VR** Instructor: Joseph A. Shaw, Montana State Univ. 8:30 AM - 12:30 PM $525 | $342 | $605 USD	
SC1215 **Deep Learning Architectures for Defense and Security** Instructor: Nasser M. Nasrabadi, West Virginia Univ. 8:30 AM - 5:30 PM $855 | $500 | $1000 USD	SC1170 **A Hands-On Introduction to Optics** Instructor: Damon Diehl, NextCorps Luminate 1:30 PM - 5:30 PM $525 | $342 | $605 USD	SC915 **Radiometry Revealed** Instructor: Joseph A. Shaw, Montana State Univ. 1:30 PM - 5:30 PM $525 | $342 | $605 USD	SC1336 **Current Trends in Miniature Camera Technology from Visible to Infrared: Optimization for Performance, Size, and Cost** Instructor: Kevin J. Matherson, Microsoft Corp.; David A. Dorn, Microsoft Corp. 8:30 AM - 5:30 PM $855 | $500 | $1000 USD	
SC1241 **Fundamentals of Infrared Sensing** Instructor: Glenn D. Boreman, The Univ. of North Carolina at Charlotte 8:30 AM - 5:30 PM $890 | $514 | $1035 USD	SC1246 **Infrared Imaging Technology Basics** Instructor: Austin A. Richards, Oculus Photonics LLP 14 April 2025 • 10:30 AM - 12:30 PM $340 | $246 | $365 USD		SC159 **Head-Mounted Displays: Design and Applications** Instructors: James E. Melzer, Thales Visionix, Inc.; Michael P. Browne, Vision Products LLC 8:30 AM - 5:30 PM $865 | $504 | $1010 USD	

MONEY-BACK GUARANTEE

We are confident that once you experience an SPIE course for yourself you will look to us for your future education needs. However, if for any reason you are dissatisfied, we will gladly refund your money. We just ask that you tell us what you did not like; suggestions for improvement are always welcome.

Digital badges and certificates

SPIE awards digital badges and certificates to participants who attend courses and complete the evaluation. Digital credentials are always accessible, easily shareable, printable at any time, and verified. For more information visit spie.org/digital-badges

SPIE reserves the right to cancel a course due to insufficient advance registration.

Onsite courses

View course descriptions and register online.

SPIE Members and Student Members receive discounts on courses.

13 April 2025	14 April 2025	15 April 2025	16 April 2025	17 April 2025
SC1288 **Problems in Autonomous Vehicle Imaging Systems** Instructor: Barbara G. Grant, Grant Drone Solutions, LLC 1:30 PM - 5:30 PM $565 | $358 | $645 USD	SC1353 **Quantum Technology Essentials for Non-Quantum Professionals** Instructor: Moamer Hasanovic, Syracuse Univ. 8:30 AM - 12:30 PM $525 | $342 | $605 USD		SC900 **Uncooled Thermal Imaging Detectors and Systems** Instructor: Charles M. Hanson, SenseIR Solutions, LLC 8:30 AM - 5:30 PM $890 | $514 | $1035 USD	
SC160 **An Introduction to Precision Stabilized Pointing and Tracking Systems** Instructor: James M. Hilkert, Alpha-Theta Technologies 8:30 AM - 5:30 PM $855 | $500 | $1000 USD	SC154 **Electro-Optical Imaging System Performance** Instructor: Gerald C. Holst, JCD Publishing 8:30 AM - 5:30 PM $920 | $526 | $1065 USD			
SC710 **NIR and SWIR Imaging Applications** Instructor: Austin A. Richards, Oculus Photonics LLP 1:30 PM - 5:30 PM $575| $362 | $655 USD	SC156 **Basic Optics for Engineers** Instructor: Glenn D. Boreman, The Univ. of North Carolina at Charlotte 8:30 AM - 5:30 PM $890| $514 | $1035 USD			
	SC789 **Introduction to Optical and Infrared Sensor Systems** Instructor: Joseph A. Shaw, Montana State Univ. 8:30 AM - 5:30 PM $855 | $500 | $1000 USD			

See full details and updates at **spie.org/dcs** or on the **SPIE App**

OPTICS & PHOTONICS International Congress

OPIC 2025

PLAN TO ATTEND
opicon.jp

21-25 April 2025
Pacifico Yokohama, Japan

Co-located with

OPTICS & PHOTONICS International Exhibition
OPIE '25

Plenary Session

Wednesday, 23 April
16:15-18:45

LASERs in Space : LASER utilization in space programs and recent topics on the optical data relay satellite in JAXA

Shiro Yamakawa
Japan Aerospace Exploration Agency (JAXA), Japan

Ultrafast Quantum Simulation and Quantum Computing with Ultracold Atom Arrays at Quantum Speed Limit

Kenji Ohmori
Institute for Molecular Science (IMS), Japan

What is Life? Towards Imaging the Molecular Machinery of the Cell

R. J. Dwayne Miller
University of Toronto, Canada

Conferences

ALPS ..... Advanced Lasers and Photon Sources
BISC ..... Biomedical Imaging and Sensing Conference
FAAP ..... The Future of Agriculture and Advanced Photonics
HEDS ..... International Conference on High Energy Density Science
ICNNQ ..... International Conference on Nano-photonics, Nano-optoelectronics and Quantum technology
LSC ..... Conference on Laser and Synchrotron Radiation Combination Experiment
LSSE ..... Laser Solutions for Space and the Earth
META ..... Meta Photonics: Design, Fabrication, Characterization, and Applications
OMC ..... Optical Manipulation and Structured Materials Conference
OPTM ..... Optical Technology and Measurement for Industrial Applications
OWPT ..... Optical Wireless and Fiber Power Transmission Conference
SI-Thru ..... Sensing and Imaging through Scattering and Fluctuating Field in Biology, Telecommunication, and Astronomy
TILA-LIC ..... Tiny Integrated Laser and Laser Ignition Conference
XOPT ..... International Conference on X-ray Optics and Applications

Organaized by OPI (OPTICS & PHOTONICS International Council)

International Partners SPIE. PHOTONICS MEDIA

SPIE Defense + Commercial Sensing Exhibition Directory

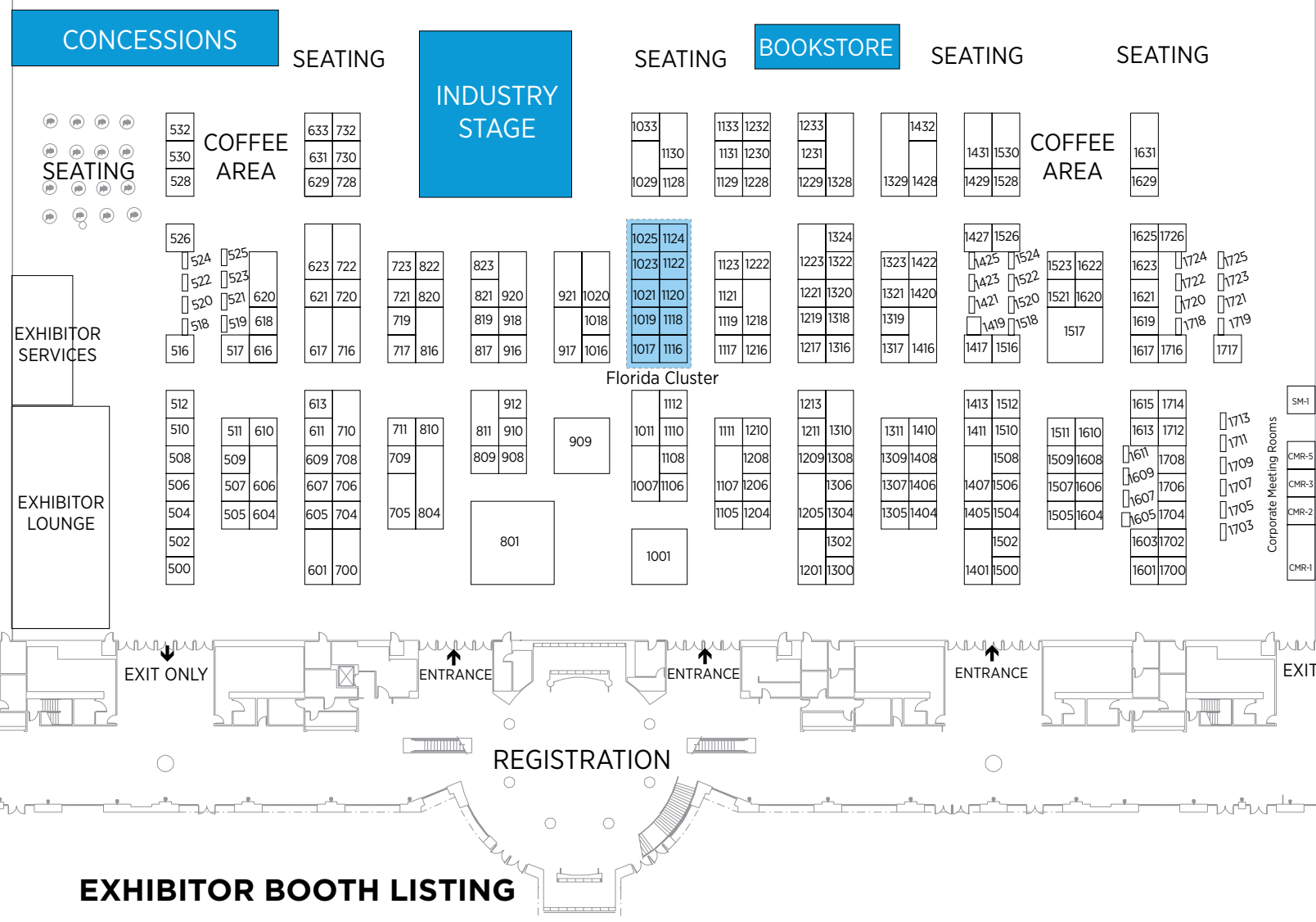
TUESDAY	10:00 AM TO 5:00 PM
WEDNESDAY	10:00 AM TO 5:00 PM
THURSDAY	10:00 AM TO 2:00 PM

Exhibitors are listed in alphabetical order with full contact information and booth location. Full company descriptions, product announcements, and other information are available on the SPIE App and on spie.org.

FEATURED TECHNOLOGIES

» Cameras and imaging systems
» Detectors and sensors
» Optical components—lenses, filters, mirrors, misc.
» Software
» Lasers and systems
» Computing and data processing hardware
» Test and measurement equipment
» Optical coatings and thin films
» Laser components, accessories, and laser systems
» Electronic and digital imaging equipment
» Electronic components
» Optomechanical components and devices
» Spectroscopy devices and equipment
» Fiber optics and accessories
» LEDs, OLEDs, and non-laser light sources
» Positioning equipment
» Electrical and signal analysis equipment
» Displays
» Materials, abrasives, and chemicals
» Nanotechnology products

EXHIBITION FLOOR PLAN



EXHIBITOR BOOTH LISTING

500 IRD Glass
502 Gurley Precision Instruments, Inc.
504 Flex Interconnect Technologies
505 Success Infrared, Inc.
506 Taylor Hobson
507 Optical Support, Inc.
508 National Aperture, Inc.
509 Novotech, Inc.
510 Bodkin Design & Engineering, LLC
511 Eidetic Optical Systems
512 Mikro-Tasarim Elektronik San. ve Tic. A.S.
516 Cincinnati Sub-Zero Products
517 Advanced Research Corp.
518 Applied Optics
519 KAYA Instruments
520 Cubert GmbH
521 GAMDAN Optics
522 Fiberware GmbH
523 Laser Focus World & Military+Aerospace Electronics
524 attocube systems Inc.
526 Vision Systems Technology, LLC
528 Optec S.p.A.
530 Officina Stellare S.p.A.
532 Precision Glass & Optics
601 AIM INFRAROT-MODULE GmbH
604 DRS Daylight Solutions
605 Tamron Americas
606 Santa Barbara Infrared, Inc.
607 Avo Photonics, Inc.
609 FormFactor, Inc.
610 Sensir Inc.
611 Advance Reproductions Corp.
613 Gentec Electro-Optics Inc.
616 MicroSupport Co., Ltd.
617 Zaber Technologies Inc.
618 PFG Precision Optics, Inc.
620 Optikos Corp.
621 ThermoAnalytics, Inc.
623 Materion Balzers Optics
629 Black Forest Engineering
629 EM4, Inc.
629 Freedom Photonics, LLC
629 Luminar Semiconductor Inc.
629 Optogration Inc.
631 Boston Micromachines Corp.
633 Symage by Geisel Software, Inc.
700 CI Systems, Inc.
704 Navitar Inc.
704 Zygo Corporation
705 Telops Inc.
705 Xenics NV
706 Rocky Mountain Instrument Co.
708 Micro Laser Systems, Inc.
709 Moori Technologies Co., Ltd.
710 Eaton Corp.
711 Lattice Materials LLC
716 IRnova AB
717 Inrad Optics
717 Luxium Solutions
717 PLX Inc.
719 DynaVac
719 OptoTech Optical Machinery, Inc.
720 Sandvik Osprey Ltd.
721 Dowa International Corp.

722 Thales Cryogenics B.V.
723 Integrated Quantum Photonics
728 Archer OpTx, Inc.
730 IO Industries, Inc.
732 Excelitas Technologies Corp.
801 Leonardo DRS
801 Leonardo UK Ltd.
804 MKS Instruments, Inc.
804 Newport/ An MKS Brand
804 Ophir Optronics Solutions Ltd., a division of MKS Instruments
804 Ophir/ An MKS Brand
809 Hamamatsu Corp.
810 Universal Photonics Inc.
811 G&H Group
816 Optiforms, Inc.
817 LaCroix Precision Optics
819 OptiPro Systems, LLC
820 Rochester Precision Optics, LLC
821 Opto-Alignment Technology, Inc.
822 Precision Optical
823 Tower Semiconductor
908 Advanced Scientific Concepts, LLC
909 SCD USA Infrared, LLC
910 Omega Optical Holdings, LLC
912 TRIOPTICS USA
916 JENOPTIK Optical Systems, LLC
917 Edmund Optics Inc.
918 AdTech Ceramics
920 i3system, Inc.
921 Hellma Materials GmbH
1001 Teledyne FLIR LLC
1001 Teledyne Imaging
1007 Coherent Aerospace & Defense, Inc.
1011 LightPath Technologies, Inc.
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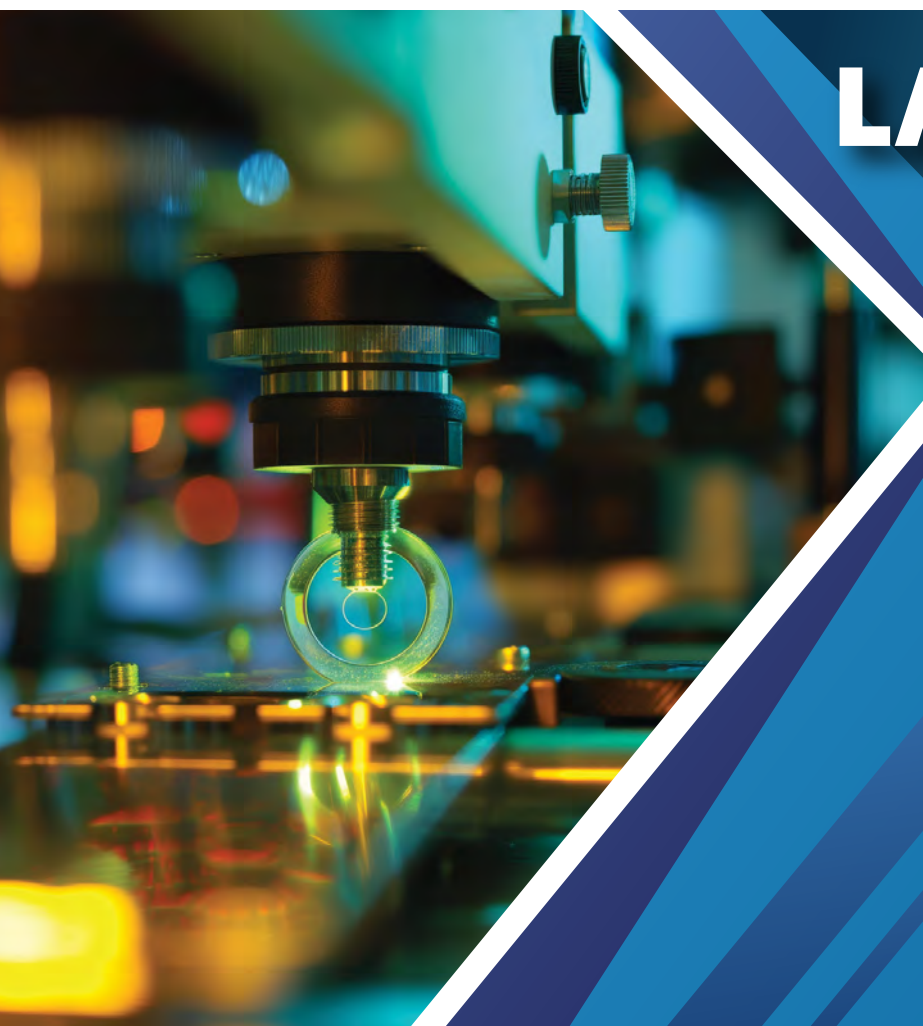

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TECHNICAL CONFERENCES

CONTENTS

CONFERENCE 13448

Advanced Photon Counting Techniques XIX

15 - 16 April 2025 | Miami 3, Ballroom Level

Conference Chair(s): **Mark A. Itzler,** Luminar Technologies, Inc. (United States); **Joshua C. Bienfang,** National Institute of Standards and Technology (United States); **K. Alex McIntosh,** MIT Lincoln Lab. (United States)

Program Committee: **Giulia Acconcia,** Politecnico di Milano (Italy); **Gerald S. Buller,** Heriot-Watt Univ. (United Kingdom); **Robert H. Hadfield,** Univ. of Glasgow (United Kingdom); **Michael A. Krainak,** Relative Dynamics, Inc. (United States); **Abigail S. Licht,** MIT Lincoln Lab. (United States); **Aurora Maccarone,** Heriot-Watt Univ. (United Kingdom); **Alan L. Migdall,** National Institute of Standards and Technology (United States); **Ivan Rech,** Politecnico di Milano (Italy); **Rebecca Holmes M. Sandoval,** Los Alamos National Lab. (United States); **Michael Wahl,** PicoQuant GmbH (Germany)

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

OPENING REMARKS

15 April 2025 • 1:00 PM - 1:10 PM | Miami 3, Ballroom Level
Session Chair(s): **Mark A. Itzler**, Luminar Technologies, Inc. (United States)
Opening remarks for Advanced Photon Counting Techniques XIX.

SESSION 1: NOVEL SINGLE PHOTON DETECTORS

15 April 2025 • 1:10 PM - 1:40 PM | Miami 3, Ballroom Level
Session Chair(s): **Mark A. Itzler**, Luminar Technologies, Inc. (United States)

13448-2 • 1:10 PM - 1:40 PM
High throughput single photon detection for effective stellar intensity interferometry *(Invited Paper)*
Author(s): **Sebastian Karl,** Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); **Verena Leopold**, **Stefan Richter,** Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany), Photonscore GmbH (Germany); **Yury Prokazov**, **Evgeny Turbin**, **Gennady Sintotskiy,** Photonscore GmbH (Germany); **Dmitry Orlov,** PHOTONIS Netherlands B.V. (Netherlands); **Joachim von Zanthier,** Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany)

SESSION 2: SPADS AND APPLICATIONS I

15 April 2025 • 1:40 PM - 3:00 PM | Miami 3, Ballroom Level
Session Chair(s): **Mark A. Itzler**, Luminar Semiconductor Inc. (United States)

13448-3 • 1:40 PM - 2:10 PM
Photon counting in stellar intensity interferometry: current status and future prospects *(Invited Paper)*
Author(s): **Elliott P. Horch,** Southern Connecticut State Univ. (United States)

13448-4 • 2:10 PM - 2:30 PM
Deep space optical communication photon counting camera
Author(s): **Abigail S. Licht**, **K. Alexander McIntosh,** MIT Lincoln Lab. (United States); **Erik Alerstam**, **Jason P. Allmaras**, **Kenneth Andrews**,

Abhijit Biswas, Jet Propulsion Lab. (United States); **Mike A. Brattain,** MIT Lincoln Lab. (United States); **Bruce Bray,** Jet Propulsion Lab. (United States); **Harry R. Clark,** MIT Lincoln Lab. (United States); **Brett P. Douglas,** Jet Propulsion Lab. (United States); **Erik K. Duerr**, **Jonathan P. Frechette,** MIT Lincoln Lab. (United States); **Linda Fuhrman**, **William M. Klipstein,** Jet Propulsion Lab. (United States); **Zach Kranefeld**, **Jason MacDonald**, **Shawn T. Moynihan,** MIT Lincoln Lab. (United States); **Jason M. Mumolo,** Jet Propulsion Lab. (United States); **Michael Myszka**, **Antonio Napoleone**, **Noah Pestana, Hermanus S. Pretorius,** MIT Lincoln Lab. (United States)

13448-5 • 2:30 PM - 3:00 PM
Designs and characterization of the Space Entanglement and Annealing QUantum Experiment (SEAQUE) detector module *(Invited Paper)*
Author(s): **Joanna Krynski,** Univ. of Waterloo (Canada); **Noura Bayat,** Univ. of Waterloo (Canada), Univ. Wien (Austria); **Kate Curvelo,** Simon Fraser Univ. (Canada), Univ. of Waterloo (Canada); **Zhenwen Wang,** Univ. of Waterloo (Canada); **Nigar Sultana,** Univ. of Waterloo (Canada), Teledyne DALSA (Canada); **Paul J. Godin,** Univ. of Waterloo (Canada); **Thomas Lehner,** DotFast (Austria); **Thomas D. Jennewein,** Univ. of Waterloo (Canada), Simon Fraser Univ. (Canada)

Coffee Break 3:00 PM - 3:30 PM

SESSION 3: SPADS AND APPLICATIONS II

15 April 2025 • 3:30 PM - 5:10 PM | Miami 3, Ballroom Level
Session Chair(s): **Abigail S. Licht**, MIT Lincoln Lab. (United States)

13448-6 • 3:30 PM - 4:00 PM
A SPAD detection strategy based on the inter-arrival time of photons for enhanced long distance LiDAR applications *(Invited Paper)*
Author(s): **Alessandro Tontini,** Fondazione Bruno Kessler (Italy); **Sonia Mazzucchi**, **Roberto Passerone,** Univ. degli Studi di Trento (Italy); **Leonardo Gasparini,** Fondazione Bruno Kessler (Italy)

13448-7 • 4:00 PM - 4:20 PM
Improving noise performance of a flash LiDAR sensor using perimeter-gated SPADs for low-light Imaging
Author(s): **Nahin Irfan, Mst Shamim Ara Shawkat,** Florida International Univ. (United States)

13448-8 • 4:20 PM - 4:50 PM
Review of germanium-silicon single-photon avalanche diodes *(Invited Paper)*
Author(s): **Neil Na,** Artilux Inc. (United States); **Erik Chen,** Artilux Inc. (Taiwan); **Gerald S Buller,** Heriot-Watt University (United Kingdom); **Robert H. Hadfield,** University of Glasgow (United Kingdom); **Richard A Soref,** University of Massachusetts, Boston (United States)

13448-9 • 4:50 PM - 5:10 PM
Artificial neural networks (ANN) for predicting the I-V characteristics of single photon avalanche diode (SPAD)
Author(s): **Kazi Mohammad Mamun**, **Nezih Pala, Mst Shamim Ara Shawkat,** Florida International Univ. (United States)

Wednesday 16 April 2025

SESSION 4: SNSPDS I

16 April 2025 • 8:30 AM - 10:00 AM | Miami 3, Ballroom Level
Session Chair(s): **Daniel Kuznesof**, Univ. of Glasgow (United Kingdom)

13448-10 • 8:30 AM - 9:00 AM
Enhancement of superconducting nanowire single-photon detectors via local helium ion irradiation *(Invited Paper)*
Author(s): **Fabian Wietschorke**, **Stefan Strohauer**, **Christian Schmid**, **Lucio Zugliani**, **Stefanie Grotowski**, **Rasmus Flaschmann**, **Jonathan J. Finley, Kai Müller,** Walter Schottky Institut (Germany)

13448-11 • 9:00 AM - 9:30 AM
Enhancing spectral sensitivity and scalability of superconducting nanowire photon detectors: mid-infrared characterization and near-infrared integration *(Invited Paper)*
Author(s): **Adan Azem,** The Univ. of British Columbia (Canada); **Dmitry V. Morozov**, **Daniel Kuznesof,** Univ. of Glasgow (United Kingdom); **Ciro Bruscino,** Univ. degli Studi di Napoli Federico II (Italy); **Becky Lin**, **Shangxuan Yu,** The Univ. of British Columbia (Canada); **Robert H. Hadfield,** Univ. of Glasgow (United Kingdom); **Lukas Chrostowski, Jeff F. Young,** The Univ. of British Columbia (Canada)

13448-12 • 9:30 AM - 10:00 AM
Optimizing photon-number resolution with superconducting nanowire multi-photon detectors *(Invited Paper)*
Author(s): **Timon Schapeler**, **Fabian Schlue**, **Michael Stefszky**, **Benjamin Brecht**, **Christine Silberhorn, Tim J. Bartley,** Univ. Paderborn (Germany)

Coffee Break 10:00 AM - 10:30 AM

SESSION 5: SNSPDS II

16 April 2025 • 10:30 AM - 12:00 PM | Miami 3, Ballroom Level
Session Chair(s): **Joshua C. Bienfang**, National Institute of Standards and Technology (United States)

13448-13 • 10:30 AM - 11:00 AM
Photonic Integrated SNSPDs: traditional methods and expanded compatibility with arbitrary substrates *(Invited Paper)*
Author(s): **Marco Colangelo,** Northeastern Univ. (United States)

13448-14 • 11:00 AM - 11:30 AM
Mid-infrared light detection and ranging with superconducting nanowires *(Invited Paper)*
Author(s): **Daniel Kuznesof,** Univ. of Glasgow (United Kingdom); **Adan Azem,** The Univ. of British Columbia (Canada); **Dmitry V. Morozov,** Univ. of Glasgow (United Kingdom); **Ciro Bruscino,** Univ. degli Studi di Napoli Federico II (Italy); **Lukas Chrostowski**, **Jeff F. Young,** The Univ. of British Columbia (Canada); **Robert H. Hadfield,** Univ. of Glasgow (United Kingdom)

13448-15 • 11:30 AM - 12:00 PM
Nanoscale high-temperature superconducting quantum sensors *(Invited Paper)*
Author(s): **Ilya Charaev,** Univ. Zürich (Switzerland); **Nicholas P. Lyons,** Raytheon ELCAN Optical Technologies (United States)

Lunch/Exhibition Break 12:00 PM - 1:40 PM

SESSION 6: SINGLE-PHOTON IMAGING I

16 April 2025 • 1:40 PM - 3:00 PM | Miami 3, Ballroom Level
Session Chair(s): **Aurora Maccarone**, Heriot-Watt Univ. (United Kingdom)

13448-16 • 1:40 PM - 2:10 PM
Sensing techniques with undetected photons in the mid-infrared *(Invited Paper)*
Author(s): **Emma L. Pearce,** Humboldt-Univ. zu Berlin (Germany); **Aron Vanselow,** Lab. de Physique de l'Ecole Normale Supérieure (France); **Ivan Zorin,** Research Ctr. for Non Destructive Testing GmbH (Austria); **Inna Kviatkovsky**, **Paul Kaufmann**, **Felipe Gewers**, **Atta ur Rehman Sherwani,** Humboldt-Univ. zu Berlin (Germany); **Philipp Hildenstein**, **Nils Werner**, **Gunnar Blume,** Ferdinand-Braun-Institut gGmbH (Germany); **Helen Chrzanowski,** Humboldt-Univ. zu Berlin (Germany); **Bettina Heise,** Research Ctr. for Non Destructive Testing GmbH (Austria); **Katrin Paschke,** Ferdinand-Braun-Institut gGmbH (Germany); **Sven Ramelow,** Humboldt-Univ. zu Berlin (Germany)

13448-17 • 2:10 PM - 2:40 PM
Quantum imaging with undetected photons of non-transmissive target *(Invited Paper)*
Author(s): **Chiara Michelini,** Univ. degli Studi di Trento (Italy); **Ugo Zanforlin,** Leonardo S.p.A. (Italy); **Alessia Suprano,** Leonardo SpA (Italy); **Francesco Poggiali**, **Massimiliano Proietti,** Leonardo S.p.A. (Italy); **Lorenzo Pavesi,** Univ. degli Studi di Trento (Italy); **Massimiliano Dispenza,** Leonardo (Italy)

13448-18 • 2:40 PM - 3:00 PM
Single-photon depth imaging for underwater target discrimination
Author(s): **Albert de Dios Carbajal**, **Rui Zhang**, **Gerald S. Buller, Aurora Maccarone,** Heriot-Watt Univ. (United Kingdom)

Coffee Break 3:00 PM - 3:30 PM

SESSION 7: SINGLE-PHOTON IMAGING II

16 April 2025 • 3:30 PM - 4:50 PM | Miami 3, Ballroom Level
Session Chair(s): **Rebecca Holmes M. Sandoval**, Los Alamos National Lab. (United States)

13448-19 • 3:30 PM - 4:00 PM
Spatial mode demultiplexing imaging in single photon regime *(Invited Paper)*
Author(s): **Luigi Santamaria Amato,** Agenzia Spaziale Italiana (Italy); **Fabrizio Sgobba,** Agenzia Spaziale Italiana (Italy), Consiglio Nazionale delle Ricerche - Istituto nazionale di Ottica (CNR-INO) (Italy); **Cosmo Lupo,** Politecnico di Bari (Italy)

13448-20 • 4:00 PM - 4:30 PM
AURORAS technique for rapid orbit determination *(Invited Paper)*
Author(s): **Harrison Krantz**, **Jeffrey J. Bloch,** Applied Research Associates, Inc. (United States); **Przemek Wozniak**, **David M. Palmer,** Los Alamos National Lab. (United States); **Peter N. McMahon-Crabtree,** Air Force Research Lab. (United States)

13448-21 • 4:30 PM - 4:50 PM

Quanta image sensors for space applications

Author(s): **Joanna Krynski**, **Vincent Goiffon,** Institut Supérieur de l'Aéronautique et de l'Espace (France); **Cédric Virmontois,** Ctr. National d'Études Spatiales (France); **Alexandre Le Roche,** Institut Supérieur de l'Aéronautique et de l'Espace (France); **Vivian Bernard**, **Alex Materne, Valerian Lalucaa,** Ctr. National d'Études Spatiales (France)

CONFERENCE 13449

Next-Generation Spectroscopic Technologies XVII

14 - 15 April 2025 | Tallahassee 2, Ballroom Level

Conference Chair(s): **Luisa T. M. Profeta,** Rigaku Analytical Devices (United States); **Steven M. Barnett,** Barnett Technical Services, LLC (United States)

Program Committee: **Abul K. Azad,** The Ctr. for Integrated Nanotechnologies (United States); **David Blair,** Headwall Photonics, Inc. (United States); **Richard A. Crocombe,** Crocombe Spectroscopic Consulting, LLC (United States); **Vassili Karanassios,** Univ. of Waterloo (Canada); **H. Ted Stinson,** DRS Daylight Solutions (United States)

Monday 14 April 2025

OPENING REMARKS

14 April 2025 • 8:40 AM - 8:50 AM | Tallahassee 2, Ballroom Level
Session Chair(s): **Luisa T. M. Profeta**, Rigaku Analytical Devices (United States)
Opening remarks for Next-Generation Spectroscopic Technologies XVII.

SESSION 1: NEW SPECTROSCOPIC APPLICATIONS I

14 April 2025 • 8:50 AM - 9:40 AM | Tallahassee 2, Ballroom Level
Session Chair(s): **Luisa T. M. Profeta**, Rigaku Analytical Devices (United States)

13449-1 • 8:50 AM - 9:20 AM
Handheld Raman technology for quality control and safety applications in the food industry *(Invited Paper)*
Author(s): **Luis Rodriguez-Saona,** The Ohio State Univ. (United States)

13449-2 • 9:20 AM - 9:40 AM
Rapid surface imaging for dedicated process monitoring
Author(s): **Steven M. Barnett, James Chan,** Soar Optics (United States)

Coffee Break 9:40 AM - 10:10 AM

SESSION 2: NOVEL OPTICS AND ALGORITHMS

14 April 2025 • 10:10 AM - 11:40 AM | Tallahassee 2, Ballroom Level
Session Chair(s): **Steven M. Barnett**, Barnett Technical Services, LLC (United States)

13449-5 • 10:10 AM - 10:40 AM
Estimation of dielectric-response functions using micro-to-macroscaling of density-functional-theory-calculated IR spectra *(Invited Paper)*
Author(s): **Samuel G. Lambrakos,** U.S. Naval Research Lab. (United States); **Lou Massa,** Hunter College (United States); **Sonjae Wallace,** Lehman College (United States); **Scott Ramsey,** U.S. Naval Research Lab. (United States)

13449-6 • 10:40 AM - 11:00 AM
Artificial intelligence approaches to address some environmental challenges using spectroscopy
Author(s): **Vassili Karanassios,** Univ. of Waterloo (Canada)

13449-7 • 11:00 AM - 11:20 AM
Ruggedized superachromatic illumination optics for UV-VIS spectroscopy
Author(s): **Jakub J. Prchlik, James Tunningley,** Reuter-Stokes (United States)

13449-8 • 11:20 AM - 11:40 AM
Spectroscopic systems for long-range, high-resolution low-coherence, polarization-sensitive interferometry for chemical and semiconductor industries

Author(s): **Wojtek J. Walecki,** Optoprofiler LLC (United States)

Lunch Break 11:40 AM - 1:10 PM

SESSION 3: SPECTROSCOPIC FIELD APPLICATIONS

14 April 2025 • 1:10 PM - 2:50 PM | Tallahassee 2, Ballroom Level
Session Chair(s): **Luisa T. M. Profeta**, Rigaku Analytical Devices (United States)

13449-9 • 1:10 PM - 1:30 PM
Optical design of Enfys: a linear variable filter spectrometer for ExoMars
Author(s): **Andrew M. Boyd**, **Andrew Carroll**, **James N. Monks**, **Daniel Gedge**, **George Hood**, **Jonathan Williams**, **Ryan Swindell,** Excelitas Technologies Corp. (United Kingdom); **Matthew Gunn,** Aberystwyth Univ. (United Kingdom); **Dafydd Fincken-Roberts,** Excelitas Technologies Corp. (United Kingdom)

13449-10 • 1:30 PM - 1:50 PM
Environmental impact on the spectral performance of gold-coated retroreflectors in UAV-based free-space optical communication systems
Author(s): **Hemani Kaushal, Steve Stagon,** Univ. of North Florida (United States)

13449-11 • 1:50 PM - 2:10 PM
Ultra-miniature low cost spectrometers and multi-spectral sensors using spectrochip (spectrometer-on-chip) technology
Author(s): **Sean Lin, Cheng-Hao Ko,** SPU Optics Inc. (United States)

13449-12 • 2:10 PM - 2:30 PM
Recent developments in portable battery-operated microplasmas for chemical analysis
Author(s): **Vassili Karanassios,** Univ. of Waterloo (Canada)

13449-31 • 2:30 PM - 2:50 PM
WASP: wideband advanced spectrometer platform
Author(s): **Alessandro Schillaci**, **Gerard Andonian**, **Loic Amoudry**, **Christopher D. Oberempt**, **Ronald Agustsoon, Robert Berry,** RadiaBeam Technologies, LLC (United States)

Coffee Break 2:50 PM - 3:20 PM

SESSION 4: NOVEL THZ AND OTHER SPECTROSCOPIC TECHNOLOGIES

14 April 2025 • 3:20 PM - 5:00 PM | Tallahassee 2, Ballroom Level
Session Chair(s): **Vassili Karanassios**, Univ. of Waterloo (Canada)

13449-13 • 3:20 PM - 3:40 PM
The EPR MOUSE
Author(s): **Joseph Hornak,** Rochester Institute of Technology (United States)

13449-14 • 3:40 PM - 4:00 PM
Terahertz enhancements through Kalman filtering
Author(s): **Isaac Spotts**, **C. Harrison Brodie,** The Univ. of British Columbia (Canada); **Brett Sicard,** McMaster Univ. (Canada); **Christopher Ty**, **Christopher M. Collier,** The Univ. of British Columbia (Canada); **S. Andrew Gadsden,** McMaster Univ. (Canada)

13449-15 • 4:00 PM - 4:20 PM
Polarization sensing of mechanical strain in THz stereo-metamaterials using compact polarimetric terahertz time-domain spectroscopy
Author(s): **M. Reefaz Rahman**, **M. Zeki Güngördü**, **Anirban Swakshar**, **Patrick Kung, Seongsin M. Kim,** The Univ. of Alabama (United States)

13449-16 • 4:20 PM - 4:40 PM
The EPR Cat
Author(s): **Edwin E. Hach,** Rochester Institute of Technology (United States); **Christopher C. Gerry,** Lehman College (United States); **Richard Birrittella,** Booz Allen Hamilton Inc. (United States); **Paul M. Alsing,** Univ. at Albany (United States)

13449-17 • 4:40 PM - 5:00 PM
Portable, sefl-powering micro- or nano-devices systems using triboelectric nanogenerators
Author(s): **Vassili Karanassios,** Univ. of Waterloo (Canada)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 5: NOVEL ENVIRONMENTAL APPLICATIONS

15 April 2025 • 11:00 AM - 12:20 PM | Tallahassee 2, Ballroom Level
Session Chair(s): **Steven M. Barnett**, Barnett Technical Services, LLC (United States)

13449-18 • 11:00 AM - 11:20 AM
Raman spectroscopy applied to in-situ natural gas and hydrogen-enriched natural gas composition measurements
Author(s): **Fabio Melison**, **Lorenzo Cocola,** CNR-Istituto di Fotonica e Nanotecnologie (Italy); **Elena Meneghin**, **Daniele Rossi,** Pietro Fiorentini SpA (Italy); **Luca Poletto,** CNR-Istituto di Fotonica e Nanotecnologie (Italy)

13449-19 • 11:20 AM - 11:40 AM
Mobile detection of benzene for environmental field surveys
Author(s): **Shin-Juh Chen**, **Richard T. Wainner**, **Matan Aviram**, **Nicholas F. Aubut, Michael B. Frish,** Physical Sciences Inc. (United States)

13449-20 • 11:40 AM - 12:00 PM
Infrared signature of ammonia cracking by high-resolution absorption spectroscopy
Author(s): **John Kelly,** Savannah River National Lab. (United States)

13449-21 • 12:00 PM - 12:20 PM
Integrating LIBS and machine learning for smart agriculture: advanced soil monitoring and pollution assessment
Author(s): **Haider M. Al-Juboori,** South East Technological Univ. (Ireland)

Lunch/Exhibition Break 12:20 PM - 1:50 PM

SESSION 6: NOVEL SPECTROSCOPIC SENSING I: JOINT SESSION WITH CONFERENCES 13449 AND 13478

15 April 2025 • 1:50 PM - 3:10 PM | Naples 2, Ballroom Level
Session Chair(s): **Christopher R. Howle**, Defence Science and Technology Lab. (United Kingdom)

13478-23 • 1:50 PM - 2:10 PM
Molecule-specific, stand-off airborne substance detection with Deep-UV excited, range-resolved, single-photon "Quantum" Raman spectroscopy: Towards an optical "tricorder" with molecular LIDAR
Author(s): **David J. M. Stothard**, **Roman Spesyvtsev**, **John Leck**, **Rory Pringle**, **Carolyn O'Dwyer**, **Craig Hunter, Stuart Bennett,** Fraunhofer Ctr. for Applied Photonics (United Kingdom)

13449-22 • 2:10 PM - 2:30 PM
Quantitative detection of chemical agents with SERS sensors
Author(s): **Li-Lin Tay,** National Research Council Canada (Canada)

13478-24 • 2:30 PM - 2:50 PM
Advances in sensing technology for chemical and biological threats
Author(s): **Nathaniel R. Gomer, Amanda Clase,** The Pennsylvania State Univ. (United States)

13478-25 • 2:50 PM - 3:10 PM
Shared embeddings for synthetic data generation across sensor modalities
Author(s): **Cate M. Dunham**, **Kevin J Metzler,** Worcester Polytechnic Institute (United States); **Chia-Wei Tsai**, **Thomas Cao,** Defense Threat Reduction Agency (United States); **Joshua Uzarski,** U.S. Army Combat Capabilities Development Command Soldier Ctr. (United States); **Randy C. Paffenroth,** Worcester Polytechnic Institute (United States)

Coffee Break 3:10 PM - 3:40 PM

SESSION 7: NOVEL SPECTROSCOPIC SENSING II: JOINT SESSION WITH CONFERENCES 13449 AND 13478

15 April 2025 • 3:40 PM - 5:00 PM | Naples 2, Ballroom Level
Session Chair(s): **Luisa T. M. Profeta**, Rigaku Analytical Devices (United States)

13478-26 • 3:40 PM - 4:00 PM
ClearShot: a through-bottle Raman sensor for noncontact chemical detection and identification
Author(s): **Rusha Chatterjee**, **Katharine Lunny**, **Michael Primrose**, **Michael Hilton**, **Michael Chase**, **Michael Ascenzi, Jay Giblin,** Physical Sciences Inc. (United States)

13449-24 • 4:00 PM - 4:20 PM
CWA and TIC library generation and laboratory validation on field portable FTIR systems
Author(s): **Katelyn Koll**, **Evan Durnal, Sara Paahlar,** MRIGlobal (United States)

13478-27 • 4:20 PM - 4:40 PM
Applications of a trace standoff Raman detection system on robotic platforms
Author(s): **Robert D. Waterbury**, **James Andrews**, **Thuyan Conghuyentonnu**, **Kyle Jurrens**, **Tim Molner**, **Ryan Robins**, **Marshall Scott, Viktor Smolski,** Alakai Defense Systems, Inc. (United States)

13449-25 • 4:40 PM - 5:00 PM **(CANCELLED)**
Chromatoscopy: a new paradigm for chemical sensing
Author(s): **Tyler J. Huffman**, **Christopher J. Breshike**, **Daniel Corbin**, **Robert Furstenberg, R. Andrew McGill,** U.S. Naval Research Lab. (United States)

CONFERENCE 13450

Energy Harvesting and Storage: Materials, Devices, and Applications XV

14 April 2025 | Miami 3, Ballroom Level

Conference Chair(s): **Peter Bermel,** Purdue Univ. (United States); **Naresh C. Das,** CCDC Army Research Lab. (United States); **Zunaid Omair,** Banpil Photonics, Inc. (United States)

Program Committee: **Md Zunaid Baten,** Bangladesh Univ. of Engineering and Technology (Bangladesh); **Deryn Chu,** U.S. Army Research Lab. (United States); **Nibir K. Dhar,** Virginia Commonwealth Univ. (United States); **Achyut K. Dutta,** Banpil Photonics, Inc. (United States); **Vijay Parameshwaran,** U.S. Army Research Lab. (United States); **Chunlei Wang,** Univ. of Miami (United States)

Monday 14 April 2025

OPENING REMARKS

14 April 2025 • 8:00 AM - 8:10 AM | Miami 3, Ballroom Level
Session Chair(s): **Zunaid Omair**, Banpil Photonics, Inc. (United States)
Opening remarks for Energy Harvesting and Storage: Materials, Devices, and Applications XV.

SESSION 1: RENEWABLE ENERGY HARVESTING

14 April 2025 • 8:10 AM - 10:30 AM | Miami 3, Ballroom Level
Session Chair(s): **Zunaid Omair**, Banpil Photonics, Inc. (United States)

13450-1 • 8:10 AM - 8:40 AM
Study of metal electrodes in a single-cell hydrogen peroxide fuel cell *(Invited Paper)*
Author(s): **Raveen Appuhamy**, **Faraz Alderson**, **Stephen A. Gadsden, Brett Sicard,** McMaster Univ. (Canada)

13450-2 • 8:40 AM - 9:00 AM
Power generation technology that converts unused waste heat into electricity: semiconductor-sensitized thermal cell
Author(s): **Sachiko Matsushita,** Institute of Science Tokyo (Japan)

13450-3 • 9:00 AM - 9:30 AM
Perovskite solar cells with organic and inorganic hole transport layers for influencing stability *(Invited Paper)*
Author(s): **Anupama B. Kaul,** Univ. of North Texas (United States)

13450-4 • 9:30 AM - 9:50 AM
Improving solar cell efficiency with upconversion layer of glass-doped Ce3+/Nd3+
Author(s): **Najla K. Almulhem,** King Faisal Univ. (Saudi Arabia)

13450-5 • 9:50 AM - 10:10 AM
Explore the creation of microgrids using photovoltaic systems installed on the roofs of residences in Puerto Rico
Author(s): **Miguel A. Goenaga-Jimenez**, **Geralis Del Valle-Nieves**, **Abdiel V. Villegas-Rodriguez,** Univ. Ana G. Méndez (United States); **Carlos A. Loperena-Alvarez,** Univ. Ana G. Méndez (United States), Univ. de Puerto Rico Mayagüez (United States); **Aleishka N. Rodriguez-Buxo,** Univ. Ana G. Méndez (United States)

13450-6 • 10:10 AM - 10:30 AM
Rapid screening of photovoltaic cells via an unsupervised neural network autoencoder
Author(s): **Peter Bermel,** Purdue Univ. (United States)

Coffee Break 10:30 AM - 10:50 AM

SESSION 2: ADVANCED MICROELECTRONICS TECHNOLOGIES

14 April 2025 • 10:50 AM - 12:00 PM | Miami 3, Ballroom Level
Session Chair(s): **Peter Bermel**, Purdue Univ. (United States)

13450-7 • 10:50 AM - 11:20 AM
Ultra-high-speed integrated millimeter-wave vertical photonic NAND FLASH with multiple high-power microwave-generating diodes and VCSEL lasers: applications for high-voltage, mixed-signal ASICs, and remote-sensing technologies *(Invited Paper)*
Author(s): **James N. Pan,** Northrop Grumman Corp. (United States), American Enterprise and License Co. (United States)

13450-8 • 11:20 AM - 11:40 AM
Multi substrate 2.5D heterogeneous integration platform for energy harvesting
Author(s): **Peter Bermel,** Purdue Univ. (United States)

13450-9 • 11:40 AM - 12:00 PM
Integrated cooling demonstration for compact RF power electronic harvesting
Author(s):

Lunch Break 12:00 PM - 1:30 PM

SESSION 3: SUSTAINABLE RECYCLING FOR ENERGY HARVESTING

14 April 2025 • 1:30 PM - 2:00 PM | Miami 3, Ballroom Level
Session Chair(s): **Peter Bermel**, Purdue Univ. (United States)

13450-11 • 1:30 PM - 2:00 PM
Laser recycling of photovoltaic and electronic waste *(Invited Paper)*
Author(s): **Mool C. Gupta**, **Pawan Kumar Kanaujia**, **Mahantesh Khetri, Abhishek Trivedi,** Univ. of Virginia (United States)

SESSION 4: ENERGY HARVESTING FOR SOCIAL BENEFIT

14 April 2025 • 2:00 PM - 2:20 PM | Miami 3, Ballroom Level
Session Chair(s): **Chunlei Wang**, Univ. of Miami (United States)

13450-16 • 2:00 PM - 2:20 PM
Comparing the effectiveness of single-compartment and dual-compartment hydrogen peroxide fuel cells
Author(s): **Raveen Appuhamy**, **Faraz Alderson**, **Stephen A. Gadsden, Alex McCafferty-Leroux,** McMaster Univ. (Canada)

Coffee Break 2:20 PM - 2:50 PM

SESSION 5: ENERGY HARVESTING AND STORAGE

14 April 2025 • 2:50 PM - 3:10 PM | Miami 3, Ballroom Level
Session Chair(s): **Peter Bermel**, Purdue Univ. (United States)

13450-17 • 2:50 PM - 3:10 PM
Strength weakness opportunities and threats for energy storage systems
Author(s): **Ammar Alkhalidi,** Univ. of Sharjah (United Arab Emirates)

SESSION 6: ENERGY HARVESTING

14 April 2025 • 3:10 PM - 3:50 PM | Miami 3, Ballroom Level
Session Chair(s): **Peter Bermel**, Purdue Univ. (United States)

13450-21 • 3:10 PM - 3:30 PM
Laser engraving of carbon fiber composite bipolar plates for fuel cells: optimization and surface characterization
Author(s): **Vinod Kumar Banoth,** Whitecell Eisenhuth GmbH & Co. KG (Germany)

13450-26 • 3:30 PM - 3:50 PM
Aluminum oxynitride-based advanced packaging, thermal management and passivation coating *(Invited Paper)*
Author(s): **Narasimha S. Prasad,** NASA Langley Research Ctr. (United States); **Jason Schmitt**, **Clinton Whiteley**, **Brian Soller, Mahyar Khosravi,** Nitride Global, Inc. (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13450-18 • 5:30 PM - 7:00 PM
Thermoelectric cooling motorcycle helmet
Author(s): **Ammar Alkhalidi,** Univ. of Sharjah (United Arab Emirates)

13450-24 • 5:30 PM - 7:00 PM
Boosting water affinity and hydrogen evolution in polymer photocatalysts with hydrophilic bis-diazirine photo-crosslinker
Author(s): **Sanghyeok An**, **Kyeong-Jun Jeong**, **Syed Zahid Hassan,** Pohang Univ. of Science and Technology (Korea, Republic of); **Gayoung Ham,** Kyungpook National University (Korea, Republic of); **Seounghyeon Kang,** Seoul National Universitiy (Korea, Republic of); **Juhyeok Lee,** Pohang Univ. of Science and Technology (Korea, Republic of); **Hyeonjong Ma,** Daegu Gyeongbuk Institute of Science&Technology (Korea, Republic of); **Jieun Kwon,** Pohang Univ. of Science and Technology (Korea, Republic of); **Sang Young Jeong,** Korea University (Korea, Republic of); **Jiwoong Yang,** Daegu Gyeongbuk Institute of Science&Technology (Korea, Republic of); **Han Young Woo,** Korea University (Korea, Republic of); **Han-Hee c Cho,** Ulsan National Institute of Science and Technology (Korea, Republic of); **Hyojung Cha,** Kyungpook National University (Korea, Republic of); **Chang Yun Son,** Seoul National Universitiy (Korea, Republic of); **Dae Sung Chung,** Pohang Univ. of Science and Technology (Korea, Republic of)

ON-DEMAND POSTERS

The posters listed below are available exclusively for online viewing during the week of SPIE Defense + Commercial Sensing 2025.

13450-12
Axial flux permanent magnet generator for effectively harvesting low-grade heat energy driven by the shape memory alloy *(Invited Paper)*
Author(s): **Zhongjie Li**, **Yuliang Xue**, **Ying Gong, Yan Peng,** Shanghai Univ. (China)

CONFERENCE 13451

Quantum Information Science, Sensing, and Computation XVII

14 - 16 April 2025 | Tampa 3, Ballroom Level

Conference Chair(s): **Michael Hayduk, Michael L. Fanto,** Air Force Research Lab. (United States)

Conference Co-Chair(s): **Carlos M. Torres,** Naval Information Warfare Ctr. Pacific (United States)

Program Committee: **Paul M. Alsing,** Univ. at Albany (United States); **Radhakrishnan Balu,** DEVCOM Army Research Lab. (United States); **Lubjana Beshaj,** U.S. Military Academy (United States); **Mishkatul Bhattacharya,** Rochester Institute of Technology (United States); **Wes Campbell,** Univ. of California, Los Angeles (United States); **Durdu O. Guney,** Michigan Technological Univ. (United States); **Louis H. Kauffman,** Univ. of Illinois at Chicago (United States); **Prem Kumar,** Northwestern Univ. (United States); **Samuel J. Lomonaco,** Univ. of Maryland, Baltimore County (United States); **Stefan F. Preble,** Rochester Institute of Technology (United States); **Kathy-Anne Soderberg,** Air Force Research Lab. - Rome (United States); **Michael A. Slocum,** Air Force Research Lab. (United States)

Monday 14 April 2025

OPENING REMARKS

14 April 2025 • 8:20 AM - 8:30 AM | Tampa 3, Ballroom Level
Session Chair(s): **Michael L. Fanto**, Air Force Research Lab. (United States)
Welcome and opening remarks for Quantum Information Science, Sensing, and Computation XVII.

SESSION 1: QUANTUM MATERIALS AND SENSORS I

14 April 2025 • 8:30 AM - 10:10 AM | Tampa 3, Ballroom Level
Session Chair(s): **Michael A. Slocum**, Air Force Research Lab. (United States)

13451-25 • 8:30 AM - 9:00 AM
Challenges and opportunities for quantum light sources based on 2D materials *(Invited Paper)*
Author(s): **Nicholas Borys,** Montana State Univ. (United States)

13451-1 • 9:00 AM - 9:20 AM
Creating a compact low-power laser threshold magnetometer utilizing the NV center in diamond
Author(s): **Gary A. Sevison,** BlueHalo (United States); **Michael S. Wolf,** Azimuth Corp. (United States); **Robert G. Bedford, Michael A. Slocum,** Air Force Research Lab. (United States)

13451-2 • 9:20 AM - 9:40 AM
Deployment and scalability of the Networked Quantum Magnetometer Array (NQMA) for subterranean detection and perimeter security applications
Author(s): **K. Jeramy Hughes,** FieldLine Industries (United States), FieldLine Medical (United States), Univ. of Colorado Boulder (United States); **George Pappas,** Defense Threat Reduction Agency (United States); **Matthew Liss**, **Ricardo Jimenez,** FieldLine Industries (United States); **Ezra Godfrey**, **XuTao Ho, Dean Allison,** FieldLine Inc. (United States)

13451-29 • 9:40 AM - 10:10 AM
Lithium niobate for acoustic and electronic applications *(Invited Paper)*
Author(s): **Mark Goorsky,** Univ. of California, Los Angeles (United States)

Coffee Break 10:10 AM - 10:40 AM

SESSION 2: QUANTUM MEC

14 April 2025 • 10:40 AM - 12:10 PM | Tampa 3, Ballroom Level
Session Chair(s): **Stefan F. Preble**, Rochester Institute of Technology (United States)

13451-7 • 10:40 AM - 11:00 AM
Advancing multijunction VCSELs for scalable quantum sensing: from lab to fab
Author(s): **Amirhossein Ghods**, **Wale Lawal**, **Sristy Agrawal**, **Haoquan Fan, John Gariano,** Mesa Quantum (United States)

13451-32 • 11:00 AM - 11:30 AM
Quantum photonic integrated circuits for heterogeneous quantum networking *(Invited Paper)*
Author(s): **Stefan F. Preble,** Rochester Institute of Technology (United States)

13451-33 • 11:30 AM - 12:10 PM
QFlex: an accessible 300 mm photonic platform for quantum technology (Keynote Presentation)
Author(s): **Lewis G. Carpenter,** AIM Photonics (United States)

Lunch Break 12:10 PM - 1:40 PM

SESSION 3: QUANTUM MATERIALS AND SENSORS II

14 April 2025 • 1:40 PM - 4:00 PM | Tampa 3, Ballroom Level
Session Chair(s): **Michael A. Slocum**, Air Force Research Lab. (United States)

13451-3 • 1:40 PM - 2:10 PM
Photophysics of quantum defects in layered materials *(Invited Paper)*
Author(s): **Sanjay Behura,** San Diego State Univ. (United States)

13451-4 • 2:10 PM - 2:40 PM
Tailoring 2D semiconductors for optoelectronic and quantum applications *(Invited Paper)*
Author(s): **Andrew J. Mannix,** Stanford Univ. (United States)

13451-6 • 2:40 PM - 3:00 PM
Enhanced detection of photons with orbital angular momentum (OAM) via optical rectification in asymmetric 2D gratings
Author(s): **Michael N. Leuenberger,** Univ. of Central Florida (United States); **Ihsan Uluturk,** U.S. Army Combat Capabilities Development Command Soldier Ctr. (United States); **Petr Moroshkin**, **Joseph Plumitallo**, **Jimmy Xu,** Brown Univ. (United States); **Richard M. Osgood,** U.S. Army Combat Capabilities Development Command Soldier Ctr. (United States)

13451-5 • 3:00 PM - 3:20 PM
High-sensitivity future single-photon detection via optical rectification in asymmetric gold gratings
Author(s): **Richard M. Osgood**, **Michael N. Leuenberger,** U.S. Army Combat Capabilities Development Command Soldier Ctr. (United States); **Jimmy Xu**, **Petr Moroshkin**, **Joseph Plumitallo,** Brown Univ. (United States); **Jin Ho Kim,** U.S. Army Combat Capabilities Development Command Soldier Ctr. (United States); **Steven Kooi,** Massachusetts Institute of Technology (United States)

13451-30 • 3:20 PM - 4:00 PM
Integrated photonics for classical and quantum sensing (Keynote Presentation)
Author(s): **Paul W. Juodawlkis,** MIT Lincoln Lab. (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

THIN FILM LITHIUM NIOBATE WORKSHOP

15 April 2025 • 1:00 PM - 5:00 PM | Tallahassee 2, Ballroom Level
Session Chair(s): **Michael L. Fanto**, Air Force Research Lab. (United States)

View Full Details: spie.org/dcs/tfln-workshop

Thin film lithium niobate (TFLN) material has potential in photonics and electro-optics to advance a variety of applications from optical data communications, autonomous vehicle navigation, signal processing, and quantum applications. Various efforts are currently progressing in manufacturing and use of the material. The Microelectronics Commons (Commons) Quantum Technology Technical Area Leads are hosting a half-day TFLN workshop to better understand the landscape, efforts, and how best to collaborate with limited resources.

13451-35 • 1:00 PM - 1:45 PM
High performance integrated photonics based on thin film lithium niobate (TFLN) (Keynote Presentation)
Author(s): **Marko Lončar,** Harvard John A. Paulson School of Engineering and Applied Sciences (United States)

13451-36 • 1:45 PM - 2:05 PM
United States domestic lithium niobate supply chain and opportunities *(Invited Paper)*
Author(s): **Matthew Whittaker,** Gooch & Housego, Cleveland (United States)

13451-39 • 2:05 PM - 2:40 PM
Panel Discussion: Materials scaling and manufacturing requirements and challenges

Coffee Break • 2:40 PM - 2:55 PM

13451-37 • 2:55 PM - 3:15 PM
HyperLight's Thin-Film Lithium Niobate (TFLN) Platform: Unlocking the Future of Integrated Photonics *(Invited Paper)*
Author(s): **Amirmahdi Honardoost,** Hyperlight Corp. (United States)

13451-40 • 3:15 PM - 3:50 PM
Panel Discussion: Integration and device design challenges and requirements

13451-38 • 4:05 PM - 4:25 PM
Applications of TFLN in clocks, quantum sensing, and quantum networks *(Invited Paper)*
Author(s): **Kartik Srinivasan,** National Institute of Standards and Technology (United States)

13451-41 • 4:25 PM - 5:00 PM
Panel Discussion: Photonics applications requirements

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the SPIE Defense + Commercial Sensing posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13451-15 • 5:30 PM - 7:00 PM
A space-compatible compact modular faint pulse source for the free beam implementation of the BB84 QKD protocol
Author(s): **Felix Kraze**, **Marcus Babin**, **Erik Beckert**, **Shadia Chowdhury**, **Thomas Dietrich**, **Michael Reibe**, **Christopher Spiess,** Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany); **Jens Müller**, **Uwe Stehr**, **Cathleen Kleinholz**, **Matthias Hein,** Technische Univ. Ilmenau (Germany); **Michael Jetter**, **Michael Zimmer,** Univ. Stuttgart (Germany); **Johannes Kripfgans,** Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM (Germany)

13451-14 • 5:30 PM - 7:00 PM
Quantum-enhanced training of large language models: a hybrid approach
Author(s): **Nan Wu**, **FangMin Song,** Nanjing Univ. (China); **Xiangdong Li,** New York City College of Technology (United States)

Wednesday 16 April 2025

SESSION 4: QUANTUM COMPUTING I

16 April 2025 • 8:00 AM - 9:50 AM | Tampa 3, Ballroom Level
Session Chair(s): **Lubjana Beshaj**, U.S. Military Academy (United States)

13451-8 • 8:00 AM - 8:20 AM
Programming quantum computers with large language models
Author(s): **Elena R. Henderson**, **Jessie M. Henderson**, **Joshua Ange**, **Mitchell A. Thornton, Darrell L. Young,** Southern Methodist Univ. (United States)

13451-9 • 8:20 AM - 8:40 AM
Optimizing supervised quantum machine learning for pixel classification
Author(s): **Mark D. Rahmes**, **Mike Garrett**, **John Penuel, Morris Akbari,** L3Harris Technologies, Inc. (United States)

13451-10 • 8:40 AM - 9:00 AM
Optimization and realization of boson sampling for true random number generation using the Xanadu X8
Author(s): **Joshua Ange, Mitchell A. Thornton,** Southern Methodist Univ. (United States)

13451-11 • 9:00 AM - 9:20 AM
Hybrid quantum-classical solution for automated labeling and validation
Author(s): **Jitesh Lalwani**, **Dana Linnet,** Artificial Brain Tech Inc. (United States); **Muthumanimaran Vetrivelan**, **Kadiyam Hari Venkat,** Artificial Brain Technology (OPC) Pvt. Ltd. (India); **Riyaaz Shaik,** UCLA Samueli School of Engineering (United States); **Babita Jajodia,** Artificial Brain Technology (OPC) Pvt. Ltd. (India)

13451-31 • 9:20 AM - 9:50 AM
Challenges and opportunities of using TFLN for trapped-ion quantum computers from the perspective of industry requirements *(Invited Paper)*
Author(s): **Kang Tan,** IonQ, Inc. (United States)

Coffee Break 9:50 AM - 10:20 AM

SESSION 5: QUANTUM COMPUTING II

16 April 2025 • 10:20 AM - 12:20 PM | Tampa 3, Ballroom Level
Session Chair(s): **Lubjana Beshaj**, U.S. Military Academy (United States)

13451-12 • 10:20 AM - 10:50 AM
Quantum neural network cryptography: exploring quantum GANs for secure cryptographic systems *(Invited Paper)*
Author(s): **Lubjana Beshaj,** U.S. Military Academy (United States)

13451-13 • 10:50 AM - 11:10 AM
Secure computation of classical data on cloud-based quantum computer using quantum fully homomorphic encryption
Author(s): **Trishita Paul,** SECQAI Ltd. (United Kingdom)

13451-26 • 11:10 AM - 11:30 AM
Comparative analysis of projector-based compression and quantum autoencoders
Author(s): **Alexei Kaltchenko**, **Rahul Chakrabarti, Wrenen D'Cunha,** Wilfrid Laurier Univ. (Canada)

13451-28 • 11:30 AM - 11:50 AM
Financial fraud detection with entropy quantum optimization versus classical machine learning
Author(s): **Babak Emami**, **David Haycraft**, **Carrie Spear**, **Lac Nguyen**, **Mohammad-Ali Miri, Nicholas Chancellor,** Quantum Computing Inc. (United States)

13451-34 • 11:50 AM - 12:20 PM
Enabling scalable fabrication of superconducting quantum technologies *(Invited Paper)*
Author(s): **Satyavolu Papa Rao,** SUNY Polytechnic Institute (United States)

Lunch/Exhibition Break 12:20 PM - 1:50 PM

SESSION 6: QUANTUM NETWORKING I

16 April 2025 • 1:50 PM - 2:30 PM | Tampa 3, Ballroom Level
Session Chair(s): **Michael L. Fanto**, Air Force Research Lab. (United States)

13451-16 • 1:50 PM - 2:10 PM
Integrated and fiber-coupled imaging system for the addressing of single ions
Author(s): **Marcus Babin,** Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany); **Michael Reibe,** Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany), Friedrich-Schiller-Univ. Jena (Germany); **Steffen Trautmann**, **Simone Fabian**, **Andre Steinbach, Erik Beckert,** Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany)

13451-17 • 2:10 PM - 2:30 PM
RF-photonic controls for quantum networks: performance of high-speed photodetectors and applications in spin state measurements
Author(s): **Carson Moseley**, **Mohammad Reefaz Rahman,** The Univ. of Alabama (United States); **Joseph M. Lukens,** Arizona State Univ. (United States); **Benjamin J. Lawrie,** Oak Ridge National Lab. (United States); **Seongsin M. Kim, Patrick Kung,** The Univ. of Alabama (United States)

Coffee Break 2:30 PM - 3:00 PM

SESSION 7: QUANTUM NETWORKING II

16 April 2025 • 3:00 PM - 4:20 PM | Tampa 3, Ballroom Level
Session Chair(s): **Michael L. Fanto**, Air Force Research Lab. (United States)

13451-18 • 3:00 PM - 3:20 PM
Improving performance of single-photon avalanche diodes for quantum photonics application
Author(s): **Sajid Hasan, Mst Shamim Ara Shawkat,** Florida International Univ. (United States)

13451-19 • 3:20 PM - 3:40 PM
Ultra-fast, low-noise, and scalable SPAD based single photon detectors for quantum imaging and sensing
Author(s): **Mst Shamim Ara Shawkat, K. M. Daiyan,** Florida International Univ. (United States)

13451-20 • 3:40 PM - 4:00 PM
Integrating post-quantum cryptography (PQC) with quantum key distribution (QKD): performance, security, and practical challenges
Author(s): **Reza Azarderakhsh, Maryam Sadat Amiri Tehrani Zadeh,** Florida Atlantic Univ. (United States)

13451-21 • 4:00 PM - 4:20 PM
Systems combining quantum entanglement, wavefront design, and quantum networks
Author(s): **James F. Smith,** Quantum Age (United States)

CONFERENCE 13452

Laser Technology for Defense and Security XX

16 April 2025 | Tallahassee 2, Ballroom Level

Conference Chair(s): **Mark Dubinskii,** DEVCOM Army Research Lab. (United States); **Mark S. Zediker,** Photonic Tek Works LLC (United States)

Program Committee: **Colin C. Baker,** U.S. Naval Research Lab. (United States); **Scott Christensen,** IPG Photonics Corp. (United States); **Chris Ebert,** Freedom Photonics, LLC (United States); **Alan Martinez,** Air Force Research Lab. (United States); **Daniel Matyas,** U.S. Army Space and Missile Defense Command (United States); **Timothy C. Newell,** ManTech International Corp. (United States)

Wednesday 16 April 2025

SESSION 1: SEMICONDUCTOR LASERS

16 April 2025 • 8:30 AM - 10:30 AM | Tallahassee 2, Ballroom Level
Session Chair(s): **Daniel Matyas**, U.S. Army Space and Missile Defense Command (United States)

13452-1 • 8:30 AM - 8:50 AM
Coherent beam combining of broad-area blue laser diodes array in a v-shaped external cavity
Author(s): **Olivier Spitz**, **Parashu R. Nyaupane, Yehuda Braiman,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

13452-2 • 8:50 AM - 9:10 AM
Fast coherent pulsing in large arrays of semiconductor lasers with transverse coupling and disordered parameters
Author(s): **Olivier Spitz**, **Luis E. Maldonado-Castillo**, **Gregg J. Scranton**, **Arindam Mishra, Yehuda Braiman,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

13452-3 • 9:10 AM - 9:30 AM
Advances in manufacturing of high peak energy diode laser stacks
Author(s): **Stewart D. McDougall**, **Tobias Barnowski,** TRUMPF Photonics, Inc. (United States); **Thilo Vekathe,** TRUMPF Photonics Inc (United States); **Katherine Atwater,** TRUMPF Photonics, Inc. (United States); **Tim Gong**, **Eric Zanghi,** TRUMPF Photonics Inc (United States); **Reza Razavi,** TRUMPF Photonics, Inc. (United States)

13452-4 • 9:30 AM - 9:50 AM
Optimal laser diode chaos properties for security applications
Author(s): **Marc Sciamanna**, **Yaya Doumbia,** CentraleSupélec (France); **Tushar Malica,** VUB B-PHOTONICS (Belgium); **Delphine Wolfersberger,** CentraleSupélec (France)

13452-5 • 9:50 AM - 10:10 AM
Watt-class high brightness 1650 nm tapered semiconductor optical amplifier for remote sensing
Author(s): **Michelle Labrecque**, **Jenna Campbell**, **Kevin McClune**, **Jes Sherman**, **Allen Chu**, **Alex Katsnelson**, **Jack Kotelnikov**, **Igor Kudryashov**, **Don Kebort**, **Gordon Morrison**, **Milan L. Mashanovitch**, **Leif A. Johansson, Paul Leisher,** Freedom Photonics, LLC (United States)

13452-6 • 10:10 AM - 10:30 AM
Power and brightness scaling in coherently coupled PCSEL arrays
Author(s): **Mingsen Pan,** The Univ. of Texas at Arlington (United States); **Chhabindra Gautam,** Semergytech, Inc. (United States); **Yudong Chen,** The Univ. of Texas at Arlington (United States); **Ming Zhou,** Stanford Univ. (United States); **Thomas J. Rotter**, **Ganesh Balakrishnan,** The Univ. of New Mexico (United States); **Shanhui Fan,** Stanford Univ. (United States); **Weidong Zhou,** The Univ. of Texas at Arlington (United States)

Coffee Break 10:00 AM - 10:30 AM

SESSION 2: BEAM CONTROL AND PROPAGATION

16 April 2025 • 10:30 AM - 11:30 AM | Tallahassee 2, Ballroom Level
Session Chair(s): **Mark S. Zediker**, Photonic Tek Works LLC (United States)

13452-8 • 10:30 AM - 10:50 AM
Enabling multiple access free space optical communications through solid state beam directing
Author(s): **Steven Jensen**, **Wyatt Smyers**, **Drew DeJarnette,** General Atomics Aeronautical Systems, Inc. (United States); **Christopher Hoy**, **Doug McKnight, Connor Wolenski,** Meadowlark Optics, Inc. (United States)

13452-7 • 10:50 AM - 11:10 AM
Coherent beam combining with optical phased array lasers for free space optical communication (FSO)
Author(s): **Ami Spira**, **Ariel Roizman**, **Ran Vered**, **Yaniv Didne, Eyal Shekel,** Civan Lasers (Israel)

13452-9 • 11:10 AM - 11:30 AM
Simulating the effects of real world physics for a directed energy system
Author(s): **Steven Lacava**, **Valerio Viti**, **Bruce Crawford,** Ansys Government Initiatives, Inc. (United States); **Walter Schwarz,** Ansys, Inc. (United States)

Lunch/Exhibition Break 11:30 AM - 1:00 PM

SESSION 3: ADVANCED LASER CONCEPTS

16 April 2025 • 1:00 PM - 2:40 PM | Tallahassee 2, Ballroom Level
Session Chair(s): **Mark S. Zediker**, Photonic Tek Works LLC (United States)

13452-12 • 1:00 PM - 1:20 PM
DUV 247.5-nm CW DPSS laser source for Raman spectroscopy
Author(s): **Viktor O. Smolski**, **Alex Jacobson,** Alakai Defense Systems, Inc. (United States); **David Welford,** Endeavour Laser Technologies (United States); **Ryan Robins**, **Marshall Scott, Robert D. Waterbury,** Alakai Defense Systems, Inc. (United States)

13452-14 • 1:20 PM - 1:40 PM
Laser induced damage studies of antireflective surface structures on silica windows for high power laser applications
Author(s): **Lynda E. Busse**, **Jesse A. Frantz**, **Leslie B. Shaw, Jasbinder S. Sanghera,** U.S. Naval Research Lab. (United States)

13452-15 • 1:40 PM - 2:00 PM
Seamless and scalable method for enlarging single crystalline materials for high energy laser applications
Author(s): **Hanna Cai**, **William Grossman,** GAMDAN Optics (United States); **Liam Pozza**, **Johnny Kha**, **Dennis Garrity,** GAMDAN Optics Inc. (United States); **Rhett Wampler, Christophe Dorrer,** University of Rochester, Laboratory of Laser Energetics (United States)

13452-32 • 2:00 PM - 2:20 PM
Advancements in anti-reflection structured surfaces (ARSS) on LBO crystals for high energy lasers
Author(s): **Thomas C. Hutchens,** The Univ. of North Carolina at Charlotte (United States), GAMDAN Optics (United States); **Lawrence B. Fischel, Hanna Cai,** GAMDAN Optics (United States)

13452-33 • 2:20 PM - 2:40 PM
Brookhaven accelerator test facility: a testbed for advanced particle accelerators and lasers
Author(s): **Sandra G. Biedron,** Element Aero, LLC (United States); **Igor Pogorelsky**, **Navid Vafaei-Najafabadi, Mark Palmer,** Brookhaven National Lab. (United States)

Coffee Break 2:40 PM - 3:10 PM

SESSION 4: FIBER LASERS

16 April 2025 • 3:10 PM - 4:50 PM | Tallahassee 2, Ballroom Level
Session Chair(s): **Alan Martinez**, Air Force Research Lab. (United States)

13452-16 • 3:10 PM - 3:30 PM
Enhanced suppression of stimulated Brillouin scattering (SBS) in high energy fiber lasers through novel chaotic phase modulation
Author(s): **Daniel Matyas,** U.S. Army Space and Missile Defense Command (United States); **Mattan S Tseng,** The Univ. of Alabama in Huntsville (United States); **Zachary C. Helton,** EO Solutions LLC (United States); **Samuel P. Bingham,** Clemson Univ. (United States); **Christapher N. Vincent, Aubrey N. Beal,** The Univ. of Alabama in Huntsville (United States)

13452-18 • 3:30 PM - 3:50 PM
Garnet claddings for YAG fiber lasers
Author(s): **John W. Drazin**, **Andrew Schlup**, **Seamus R. McGarvey,** UES, Inc. (United States); **Benjamin Gray**, **Alan Martinez**, **Kurt G. Eyink,** Air Force Research Lab. (United States); **Emily Sheaf,** SOCHE (United States); **Randall S. Hay,** Air Force Research Lab. (United States)

13452-20 • 3:50 PM - 4:10 PM **(CANCELLED)**
Fully integrated hybrid silica-crystal fiber laser
Author(s): **Rajesh Thapa, Mark Dubinskii,** DEVCOM Army Research Lab. (United States)

13452-21 • 4:10 PM - 4:30 PM
An alternative method of changing the pulse duration in a stretcher-compressor pair by changing the gas pressure in the compressor
Author(s): **Ildar A. Begishev**, **Jake Bromage, Jonathan D. Zuegel,** Univ. of Rochester (United States)

13452-19 • 4:30 PM - 4:50 PM
Hollow core fibers for gas-filled Raman lasers
Author(s): **Andre J. Van Rynbach**, **Eric J. Turner,** Air Force Research Lab. (United States); **Darren Hudson**, **James Drake**, **Timothy Bate**, **Joseph Wahlen**, **Jose Enrique Antonio-Lopez, Rodrigo Amezcua-Correa,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

CONFERENCE 13453

Window and Dome Technologies and Materials XVIII

17 April 2025 | Naples 2, Ballroom Level

Conference Chair(s): **W. Howard Poisl,** The Univ. of Arizona (United States)

Program Committee: **Mary Kay Herndon,** RTX Corp. (United States); **John S. McCloy,** Washington State Univ. (United States); **Jessica DeGroote Nelson,** Edmund Optics Inc. (United States); **Clara Rivero-Baleine,** Lockheed Martin Missiles and Fire Control (United States); **Colin M. Ryan,** Naval Air Warfare Ctr. Weapons Div. (United States); **Melissa Seitz,** Coherent Aerospace & Defense, Inc. (United States); **Keith Slinker,** Air Force Research Lab. - Wright Patterson AFB (United States); **Michael E. Thomas,** Johns Hopkins Univ. Applied Physics Lab. (United States)

Tuesday 15 April 2025

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level

Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13453-18 • 5:30 PM - 7:00 PM
Electrochromic smart windows with visible-light modulation and radiation UV filter
Author(s): **Andre F. S. Guedes**, **Rafael Lima,** Univ. Estácio de Sá (Brazil); **Simone Tartari,** INTELLECTOS (Brazil)

13453-24 • 5:30 PM - 7:00 PM
Liquid-film rupture for web-like Ag nanowires toward high-performance organic Schottky barrier transistors
Author(s): **Hye Ryun Sim**, **Sangjun Lee**, **Juhyeok Lee**, **Syed Zahid Hassan**, **Geon-Hee Nam**, **Chan So**, **Kyu Min Sim, Dae Sung Chung,** Pohang Univ. of Science and Technology (Korea, Republic of)

Thursday 17 April 2025

OPENING REMARKS

17 April 2025 • 8:20 AM - 8:25 AM | Naples 2, Ballroom Level
Session Chair(s): **W. Howard Poisl**, The Univ. of Arizona (United States)
Opening remarks for Window and Dome Technologies and Materials XVIII.

SESSION 1: OPTICAL CHARACTERIZATION TECHNIQUES

17 April 2025 • 8:25 AM - 9:55 AM | Naples 2, Ballroom Level
Session Chair(s): **W. Howard Poisl**, The Univ. of Arizona (United States)

13453-1 • 8:25 AM - 8:55 AM
Honoring Daniel Harris contributions to the window and dome community *(Invited Paper)*
Author(s): **W. Howard Poisl,** The Univ. of Arizona (United States); **Michael E. Thomas,** Johns Hopkins Univ. (United States)

13453-2 • 8:55 AM - 9:15 AM
A generalized wave-propagation-based measurement model for photothermal common-path interferometry (PCI)
Author(s): **Noah Talisa**, **Michael E. Thomas, Katherine A. Lakomy,** Johns Hopkins Univ. (United States)

13453-3 • 9:15 AM - 9:35 AM
Absorption of optical materials measured with photo-thermal common-path interferometry
Author(s):

13453-4 • 9:35 AM - 9:55 AM
Absorption measurements of optical window materials at elevated temperatures via photothermal common-path interferometry with laser heating
Author(s): **Stuart Jackson**, **Michael E. Thomas, James B. Spicer,** Johns Hopkins Univ. (United States)

Coffee Break 9:55 AM - 10:20 AM

SESSION 2: OPTICAL MATERIALS FOR WINDOW APPLICATIONS

17 April 2025 • 10:20 AM - 11:40 AM | Naples 2, Ballroom Level
Session Chair(s): **John S. McCloy**, Washington State Univ. (United States); **Gregory Hollows**, Edmund Optics Inc. (United States)

13453-5 • 10:20 AM - 10:40 AM
Glass emission stabilization at elevated temperatures
Author(s): **Miguel Vallejo, Janet Elías,** Univ. de Guanajuato (Mexico)

13453-6 • 10:40 AM - 11:00 AM
Film with adjustable light conspicuity coating for optical neutralization (FALCON)
Author(s): **Donald Davis,** Kent Displays, Inc. (United States)

13453-7 • 11:00 AM - 11:20 AM
A transparent window able to shield radiation
Author(s): **Janet Elías, Miguel Vallejo,** Univ. de Guanajuato (Mexico)

13453-8 • 11:20 AM - 11:40 AM
Infrared transmitting polymer optics
Author(s): **Ranjan Dash**, **Kapil Sheth,** SABIC (United States); **Vaidyanath Ramakrishnan,** SABIC (Netherlands)

Lunch/Exhibition Break 11:40 AM - 1:10 PM

REMARKS

17 April 2025 • 1:10 PM - 1:15 PM | Naples 2, Ballroom Level
Session Chair(s): **W. Howard Poisl**, The Univ. of Arizona (United States)
Remarks for Window and Dome Technologies and Materials XVIII.

SESSION 3: PROCESSING AND PROPERTIES OF OPTICAL MATERIALS

17 April 2025 • 1:15 PM - 2:55 PM | Naples 2, Ballroom Level
Session Chair(s): **Colin M. Ryan**, Naval Air Warfare Ctr. Weapons Div. (United States); **Melissa Seitz**, Coherent Aerospace & Defense, Inc. (United States)

13453-21 • 1:15 PM - 1:35 PM
Scaling fabrication of random anti-reflective structured surfaces (rARSS) to large windows for high laser power applications
Author(s): **Jacob R. Hay**, **Benjamin A. Vaca**, **Tyler A. Benge**, **Sean P. Campbell**, **Stephaine Alvarez**, **Joseph M. Phillips**, **Ishwar D. Aggarwal, Thomas C. Hutchens,** The Univ. of North Carolina at Charlotte (United States)

13453-10 • 1:35 PM - 1:55 PM
The effect of surface finishing techniques on the CW laser damage threshold of common chalcogenide glasses
Author(s): **Rashi Sharma**, **Daniel Wiedeman**, **Zeus Gannon**, **Andrew W. Howe**, **Kathleen A. Richardson, Martin Richardson,** Univ. of Central Florida (United States)

13453-11 • 1:55 PM - 2:15 PM
The optomechanical properties of calcium lanthanum sulfide
Author(s): **Andrew W. Howe**, **Andrew Cooper**, **Alexandros Kostogiannes**, **Brian Butkus**, **Barbara Cook**, **Eric Bissell,** Univ. of Central Florida (United States); **Jeffery Geldmeier**, **Clara Rivero-Baleine,** Lockheed Martin Missiles and Fire Control (United States); **Parag Banerjee**, **Romain Gaume, Kathleen A. Richardson,** Univ. of Central Florida (United States)

13453-13 • 2:15 PM - 2:35 PM
Glass formation and properties of multispectral chalcogenide glass and glass ceramics of GeSe2-Ga2Se3-CsCl composition
Author(s): **Rashi Sharma**, **Sarah Banker,** Univ. of Central Florida (United States); **James Marro,** SCHOTT North America, Inc. (United States); **Matthew Murachver**, **Brad Pindzola,** Triton Systems, Inc. (United States); **Kathleen A. Richardson,** Univ. of Central Florida (United States)

13453-14 • 2:35 PM - 2:55 PM
The effects of sintering pressure and temperature on hot-pressed yttrium oxide
Author(s): **Joseph M. Tallan**, **Malin C. Dixon Wilkins**, **Sam E. Karcher**, **John P. Pittman, John S. McCloy,** Washington State Univ. (United States)

Coffee Break 2:55 PM - 3:20 PM

SESSION 4: MATERIALS FOR SENSORS

17 April 2025 • 3:20 PM - 4:20 PM | Naples 2, Ballroom Level
Session Chair(s): **Keith Slinker**, Air Force Research Lab. - Wright Patterson AFB (United States); **Mary Kay Herndon**, RTX Corp. (United States)

13453-9 • 3:20 PM - 3:40 PM
Practical guidelines for specifying germanium and silicon for IR windows and lenses
Author(s): **Melissa Seitz,** Coherent Aerospace & Defense, Inc. (United States)

13453-15 • 3:40 PM - 4:00 PM
Sustainable chalcogenide hybrid inorganic/organic polymers (CHIPs) for short wave and mid wave infrared imaging and sensing
Author(s): **Nicholas Lyons**, **Gerald Uyeno,** Raytheon (United States); **Jeff Pyun**, **Robert Norwood,** The Univ. of Arizona (United States); **Michael MacKay,** Univ. of Delaware (United States)

13453-17 • 4:00 PM - 4:20 PM
High-temperature dielectric characterization and compositional tailoring of oxide-oxide ceramic matrix composites
Author(s): **Wylie Simpson**, **Antonios Tontisakis,** Axiom Materials, Inc. (United States); **Cheryl Xu,** North Carolina State Univ. (United States); **Marc Simpson,** 3M Co. (United States)

CONFERENCE 13454

Image Sensing Technologies: Materials, Devices, Systems, and Applications XII

14 - 16 April 2025 | Miami 2, Ballroom Level

Conference Chair(s): **Nibir K. Dhar,** Virginia Commonwealth Univ. (United States); **Achyut K. Dutta,** Banpil Photonics, Inc. (United States); **Sachidananda R. Babu,** NASA Earth Science Technology Office (United States)

Program Committee: **Arvind I. D'Souza,** Leonardo DRS (United States); **Samiran Ganguly,** Virginia Commonwealth Univ. (United States); **Michael D. Gerhold,** U.S. Army Research Office (United States); **Parminder Ghuman,** NASA Earth Science Technology Office (United States); **Sarath D. Gunapala,** Jet Propulsion Lab. (United States); **Randolph N. Jacobs,** U.S. Army CCDC C5ISR Ctr. Night Vision & Electronic Sensors Directorate (United States); **Margaret Kim,** The Univ. of Alabama (United States); **Sanjay Krishna,** The Ohio State Univ. (United States); **Hidenori Mimura,** Shizuoka Univ. (Japan); **Willie J. Padilla,** Duke Univ. (United States); **Vijay Parameshwaran,** U.S. Army Research Lab. (United States); **Mukti M. Rana,** Delaware State Univ. (United States); **K. Kay Son,** HRL Labs., LLC (United States); **Ashok K. Sood,** Magnolia Optical Technologies, Inc. (United States); **Mani Sundaram,** QmagiQ, LLC (United States); **Siva Sivananthan,** Univ. of Illinois Chicago (United States); **Priyalal S. Wijewarnasuriya,** Teledyne Imaging Sensors (United States)

Monday 14 April 2025

WELCOME AND OPENING REMARKS

14 April 2025 • 8:00 AM - 8:10 AM | Miami 2, Ballroom Level

Welcome and opening remarks for Image Sensing Technologies: Materials, Devices, Systems, and Applications XII.

SESSION 1: ADVANCED PHOTODETECTORS AND IMAGE SENSORS I

14 April 2025 • 8:10 AM - 10:00 AM | Miami 2, Ballroom Level

Session Chair(s): **Nibir K. Dhar**, Virginia Commonwealth Univ. (United States); **Parminder Ghuman**, NASA Earth Science Technology Office (United States)

13454-13 • 8:10 AM - 8:40 AM

Nonlocal metasurfaces for image processing *(Invited Paper)*

Author(s): **Andrea Alù,** The City Univ. of New York Advanced Science Research Ctr. (United States)

13454-2 • 8:40 AM - 9:00 AM

Next generation quantum dot SWIR sensors

Author(s): **Artem Shulga**, **Juul Gielens, Dima Bederak,** QDI Systems B.V. (Netherlands)

13454-3 • 9:00 AM - 9:20 AM

Infrared imaging at hypersonic speeds: assessing sub-microsecond exposure

Author(s): **Fabien Dupont**, **Joseph A. Carrock,** Telops Inc. (Canada); **Benjamin Saute,** Telops, Inc. (Canada); **Antoine Dumont, Jean-Philippe Gagnon,** Telops Inc. (Canada)

13454-4 • 9:20 AM - 9:40 AM

Reconfigurable multicolor infrared metasurfaces with phase change materials *(Invited Paper)*

Author(s): **Jeong-Sun Moon**, **K. Kay Son**, **Ryan Quarfoth**, **Hwa-Chang Seo**, **Chuong Dao**, **Hanseung Lee, Aaron Bluestone,** HRL Labs., LLC (United States)

13454-5 • 9:40 AM - 10:00 AM

Scalable InGaAs photodetector arrays on large diameter substrates

Author(s): **Matthew M. Dummer**, **Bei Shi**, **Simone Suran Brunelli**, **Michael McGivney**, **Douglas Oakley, Jonathan Klamkin,** Aeluma, Inc. (United States)

Coffee Break 10:00 AM - 10:30 AM

SESSION 2: ADVANCED PHOTODETECTORS AND IMAGE SENSORS II

14 April 2025 • 10:30 AM - 12:00 PM | Miami 2, Ballroom Level
Session Chair(s): **Sachidananda R. Babu**, NASA Earth Science Technology Office (United States); **Arvind I. D'Souza**, Leonardo DRS (United States)

13454-6 • 10:30 AM - 11:00 AM
Antimonides type-II focal plane arrays for Earth remote sensing instruments *(Invited Paper)*
Author(s): **Sarath D. Gunapala,** Jet Propulsion Lab. (United States)

13454-7 • 11:00 AM - 11:20 AM
Metasurface sensors for microwave imaging *(Invited Paper)*
Author(s): **David R. Smith**, **Aaron V. Diebold, Michael Boyarsky,** Duke Univ. (United States)

13454-8 • 11:20 AM - 11:40 AM
SWIFT EI: the world's first SWIR event-based sensor
Author(s): **Rahel Faruhi, Nuriel Amir,** SCD SemiConductor Devices (Israel)

13454-9 • 11:40 AM - 12:00 PM
Approaching image intensifier tube low-light performance with CMOS SPAD cameras in size and power-constrained applications
Author(s): **Rui Jin**, **Frank C. Holloway**, **Kevin J. Matherson**, **Minseok Oh**, **Sarah E. Runchey**, **Benjamin K. Gratias**, **David S. Steidley**, **Gina M. Montesanti**, **Reid S. Sutherland**, **Casey Miller,** Anduril Industries, Inc. (United States); **Muhammed Nur Talha Kilic,** Microsoft Corp. (United States); **Carli A. Connally**, **Justin E. Forrester**, **David A. Dorn, David C. Rohn,** Anduril Industries, Inc. (United States)

Lunch Break 12:00 PM - 1:30 PM

SESSION 3: QUANTUM SENSING I

14 April 2025 • 1:30 PM - 2:20 PM | Miami 2, Ballroom Level
Session Chair(s): **K. Kay Son**, HRL Labs., LLC (United States); **Achyut K. Dutta**, Banpil Photonics, Inc. (United States)

13454-10 • 1:30 PM - 2:00 PM
The DARPA OpTIm program (Keynote Presentation)
Author(s): **Mukund Vengalattore,** Defense Advanced Research Projects Agency (United States)

13454-11 • 2:00 PM - 2:20 PM
Resonant photonic lattices: physical principles and application in dark-state image sensing *(Invited Paper)*
Author(s): **Robert Magnusson**, **Soohyun Lee,** The Univ. of Texas at Arlington (United States); **Yeong H. Ko,** Kongju National Univ. (Korea, Republic of)

Coffee Break 2:20 PM - 2:50 PM

SESSION 4: QUANTUM SENSING II

14 April 2025 • 2:50 PM - 4:40 PM | Miami 2, Ballroom Level
Session Chair(s): **Achyut K. Dutta**, Banpil Photonics, Inc. (United States); **K. Kay Son**, HRL Labs., LLC (United States)

13454-14 • 2:50 PM - 3:20 PM
Scalable approaches to quantum information (Keynote Presentation)
Author(s): **Mukund Vengalattore,** Defense Advanced Research Projects Agency (United States)

13454-15 • 3:20 PM - 3:40 PM
Rydberg atomic radio at quantum limits: advanced sensing for defense and commercial applications
Author(s): **David Anderson,** Rydberg Technologies LLC (United States)

13454-16 • 3:40 PM - 4:00 PM
Imaging light-matter interactions using low kinetic energy photoelectrons *(Invited Paper)*
Author(s): **Andrew R. Kim**, **Alexander M. Boehm**, **Morgann Berg**, **Taisuke Ohta**, **Chloe Doiron,** Sandia National Labs. (United States); **Fernando Vega,** Purdue Univ. (United States); **Jaeyeon Yu**, **Joseph Klesko**, **Sylvain Gennaro,** Sandia National Labs. (United States); **Fangze Liu,** Los Alamos National Lab. (United States); **Sean Smith**, **Guild Copeland,** Sandia National Labs. (United States); **Calvin Chan,** Univ. of Colorado Boulder (United States); **Aditya Mohite,** Rice Univ. (United States); **Alexander Cerjan,** Sandia National Labs. (United States); **Thomas Beechem,** Purdue Univ. (United States); **Michael Sinclair**, **Igal Brener, Raktim Sarma,** Sandia National Labs. (United States)

13454-17 • 4:00 PM - 4:20 PM
Diamond materials for quantum sensing applications
Author(s): **Andrew Edmonds**, **Teodoro Graziosi**, **Rajesh Patel**, **Nicola Palmer**, **David Ford, Matthew L. Markham,** Element Six (UK) Ltd. (United Kingdom)

13454-18 • 4:20 PM - 4:40 PM
FLAMES: a flash lidar image sensor chip for rendezvous and landing applications
Author(s): **Victor Schuddinck**, **Gaozhan Cai**, **Mohamed El-Barkouky,** Caeleste BV (Belgium); **Karl Haugholt,** SINTEF (Norway); **Matthew Soman,** European Space Research and Technology Ctr., European Space Agency (Netherlands); **Bart Deschepper**, **Jente Basteleus**, **Bart Dierickx,** Caeleste BV (Belgium); **Håvard Tørring** , **Baard Nossum,** SINTEF (Norway); **Jan P. Vermeiren,**Caeleste BV (Belgium)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 5: QUANTUM SENSING III

15 April 2025 • 11:00 AM - 12:00 PM | Miami 2, Ballroom Level
Session Chair(s): **K. Kay Son**, HRL Labs., LLC (United States); **Achyut K. Dutta**, Banpil Photonics, Inc. (United States)

13454-19 • 11:00 AM - 11:20 AM
Quantum-enhanced electromagnetic sensing (Keynote Presentation)
Author(s): **Mukund Vengalattore,** Defense Advanced Research Projects Agency (United States)

13454-20 • 11:20 AM - 11:40 AM
Complex frequency excitations for imaging and sensing *(Invited Paper)*
Author(s): **Andrea Alù,** The City Univ. of New York Advanced Science Research Ctr. (United States)

13454-22 • 11:40 AM - 12:00 PM
Dynamic beam steering and switching with active metasurfaces at mid-IR frequencies *(Invited Paper)*
Author(s): **Min Seok Jang,** KAIST (Korea, Republic of)

Lunch/Exhibition Break 12:00 PM - 1:30 PM

SESSION 6: METAMATERIALS

15 April 2025 • 1:30 PM - 2:30 PM | Miami 2, Ballroom Level
Session Chair(s): **Sarath D. Gunapala**, Jet Propulsion Lab. (United States); **Achyut K. Dutta**, Banpil Photonics, Inc. (United States)

13454-24 • 1:30 PM - 1:50 PM
Efficient optical nonlinearities in metasurfaces enabled by bound states in the continuum *(Invited Paper)*
Author(s): **Hayk Harutyunyan,** Emory Univ. (United States)

13454-25 • 1:50 PM - 2:10 PM
Meta-optics for edge computing *(Invited Paper)*
Author(s): **Jason G. Valentine**, **Brandon Swartz,** Vanderbilt Univ. (United States); **Greg Forcherio,** Naval Surface Warfare Ctr. Crane Div. (United States); **Yuankai Huo,** Vanderbilt Univ. (United States)

13454-26 • 2:10 PM - 2:30 PM
Ultra-compact high-speed metasurface polarimetric imaging microscope and its applications *(Invited Paper)*
Author(s): **Yu Yao**, **Jiawei Zuo, Mo Tian,** Arizona State Univ. (United States)

Coffee Break 2:30 PM - 3:00 PM

SESSION 7: NOVEL COATINGS AND STRUCTURES

15 April 2025 • 3:00 PM - 4:20 PM | Miami 2, Ballroom Level
Session Chair(s): **Arvind I. D'Souza**, Leonardo DRS (United States); **K. Kay Son**, HRL Labs., LLC (United States)

13454-27 • 3:00 PM - 3:20 PM
Vertically aligned carbon nanotube electrical substitution radiometer advances
Author(s): **Bradley Pelz**, **Christopher Yung**, **Nathan Tomlin**, **John Lehman**, **Michelle Stephens,** National Institute of Standards and Technology (United States); **Cameron Straatsma, Dave Harber,** Lab. for Atmospheric and Space Physics (United States)

13454-28 • 3:20 PM - 3:40 PM
On-chip thin-film filters for multispectral LWIR imaging
Author(s): **Thomas Perrillat-Bottonet**, **Laurent Dussopt**, **Laurent Carle**, **Gaëlle Chamiot-Maitral**, **Geoffroy Dumont**, **Valérie Goudon**, **Mélanie Le Cocq**, **Antoine Schembri, Claire Vialle,** CEA-LETI-DOPT (France)

13454-30 • 3:40 PM - 4:00 PM
Tunable infrared optical components using phase transitions *(Invited Paper)*
Author(s): **Mikhail A. Kats,** Univ. of Wisconsin-Madison (United States)

13454-31 • 4:00 PM - 4:20 PM
Reconfigurable metaphotonic structures using volatile and nonvolatile phase-change materials *(Invited Paper)*
Author(s): **Reza Marzban**, **Hamed Abiri**, **Ashkan Zandi**, **Sajjad Abdollahramezani**, **Amin Khavasi**, **Mohammad R. Tavakol Harandi, Ali Adibi,** Georgia Institute of Technology (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13454-47 • 5:30 PM - 7:00 PM
Polaron-induced SWIR detection in Anion-doped polymer systems
Author(s): **Chan So,** Pohang Univ. of Science and Technology (Korea, Republic of)

13454-48 • 5:30 PM - 7:00 PM
High-performance shortwave infrared organic photodiodes enabled by polaron absorption in doped polymers
Author(s): **Sangjun Lee**, **Hye Ryun Sim**, **Chan So, Dae Sung Chung,** Pohang Univ. of Science and Technology (Korea, Republic of)

13454-49 • 5:30 PM - 7:00 PM
Engineering perfluoroarene-based wide-bandgap spacers to enhance performance of organic photodiodes
Author(s): **SeYeon Baek**, **Sangjun Lee**, **Syed Zahid Hassan**, **Sanghyeok An, Dae Sung Chung,** Pohang Univ. of Science and Technology (Korea, Republic of)

13454-51 • 5:30 PM - 7:00 PM
Internalization of ionic transport ability of polymer semiconductors via photochemical crosslinking
Author(s): **Won Jun Pyo,** Pohang Univ. of Science and Technology (Korea, Republic of); **Seunghyun Lee,** Chungbuk National Univ. (Korea, Republic of); **Syed Zahid Hassan**, **Dowan Kim,** Pohang Univ. of Science and Technology (Korea, Republic of); **Junho Jung**, **Evan. S. H. Kang,** Chungbuk National Univ. (Korea, Republic of); **Dae Sung Chung,** Pohang Univ. of Science and Technology (Korea, Republic of)

13454-33 • 5:30 PM - 7:00 PM
Intrinsically stretchable High-k dielectrics metal oxide transistor with azide-functionalized coordination ligand for skin electronics
Author(s): **Jieun Kwon**, **Syed Zahid Hassan, Dae Sung Chung,** Pohang Univ. of Science and Technology (Korea, Republic of)

13454-39 • 5:30 PM - 7:00 PM
Fabrication of spherical optoelectronic devices using substrate gyroscope motion in a thermal deposition system
Author(s): **Taek Min Kim,** Pohang Univ. of Science and Technology (Korea, Republic of)

13454-43 • 5:30 PM - 7:00 PM
Fabrication of PbS QD-mediated organic-inorganic hybrid SWIR OPDs using FPA-S photo-crosslinker
Author(s): **Kyobin Park,** Pohang Univ. of Science and Technology (Korea, Republic of)

13454-66 • 5:30 PM - 7:00 PM
Imaging cloud coverage with low-cost ground-based photography
Author(s): **Kevin Barton**, **Kay Conner**, **Charlie Grey**, **Charlie Lerch**, **Adam Schmidt**, **Victoria Tran, Paige Wright,** Rochester Institute of Technology (United States)

13454-63 • 5:30 PM - 7:00 PM
Zwitterionic crosslinkers as universal solutions for high performance OMIECs
Author(s): **Junseo Kim, Dae Sung Chung,** Pohang Univ. of Science and Technology (Korea, Republic of)

Wednesday 16 April 2025

REMARKS

16 April 2025 • 8:20 AM - 8:30 AM | Miami 2, Ballroom Level
Remarks for Image Sensing Technologies: Materials, Devices, Systems, and Applications XII

SESSION 8: METAMATERIALS AND OPTICS

16 April 2025 • 8:30 AM - 10:00 AM | Miami 2, Ballroom Level
Session Chair(s): **Achyut K. Dutta**, Banpil Photonics, Inc. (United States); **Parminder Ghuman**, NASA Earth Science Technology Office (United States)

13454-32 • 8:30 AM - 9:00 AM
2D and 3D meta-optics for sorting light *(Invited Paper)*
Author(s): **Andrei Faraon**, **Phillippe Pearson**, **Ian Foo**, **Yiran Gu, Ayse B. Baspinar,** Caltech (United States)

13454-34 • 9:00 AM - 9:20 AM
Mueller matrix based imaging enabled by polarization demultiplexing metasurfaces
Author(s): **Anirban Swakshar**, **Karsten Schnier**, **Cooper Coldwell**, **Sevgi Gurbuz**, **Seongsin M. Kim, Patrick Kung,** The Univ. of Alabama (United States)

13454-35 • 9:20 AM - 9:40 AM
Quantum engineering of nonlinearities in superconducting metamaterials
Author(s): **Chen Qian**, **Steven W. Gassner**, **Eugene J. Mele, Bo Zhen,** Univ. of Pennsylvania (United States)

13454-36 • 9:40 AM - 10:00 AM
First-principles study on structural, electronic, mechanical, and optical properties of indium (III) oxide
Author(s): **Razia Khan Sharme**, **Mahin Muntasir, Mukti Rana,** Delaware State Univ. (United States)

Coffee Break 10:00 AM - 10:30 AM

SESSION 9: OPTICAL SENSORS AND PROCESSING I

16 April 2025 • 10:30 AM - 11:40 AM | Miami 2, Ballroom Level
Session Chair(s): **Arvind I. D'Souza**, Leonardo DRS (United States)

13454-37 • 10:30 AM - 11:00 AM
Passively upconverting low-intensity incoherent near-infrared light into the visible *(Invited Paper)*
Author(s): **Mikhail A. Kats,** Univ. of Wisconsin-Madison (United States)

13454-38 • 11:00 AM - 11:20 AM
Meta-optical encoders for high-resolution computer vision *(Invited Paper)*
Author(s): **Arka Majumdar,** Univ. of Washington (United States)

13454-40 • 11:20 AM - 11:40 AM
Extremely sensitive gas plume imaging
Author(s): **John S. Hager,** HEAT, LLC (United States)

SESSION 10: OPTICAL SENSORS AND PROCESSING II

16 April 2025 • 11:40 AM - 12:30 PM | Miami 2, Ballroom Level
Session Chair(s): **Achyut K. Dutta**, Banpil Photonics, Inc. (United States); **Nibir K. Dhar**, Virginia Commonwealth Univ. (United States)

13454-41 • 11:40 AM - 12:10 PM
Nonlinear optoelectronics millimeter wave photonic CMOS image sensor: improved sensing and computing capabilities for pixel arrays and readout ICs *(Invited Paper)*
Author(s): **James N. Pan,** Northrop Grumman Corp. (United States), American Enterprise and License Co. (United States)

13454-42 • 12:10 PM - 12:30 PM
A comparison of machine learning multiband sensor fusion models for detection of central African forest elephants to prevent poaching
Author(s): **Sam B. Siewert,** California State Univ., Chico (United States); **Lucas R Butler,** California State University Chico (United States)

ON-DEMAND POSTERS

The posters listed below are available exclusively for online viewing during the week of SPIE Defense + Commercial Sensing 2025.

13454-29
Deposition-controlled reflectance features based on surface topology
Author(s): **Jesse H. Duncan**, **Scott Ramsey**, **Troy Mayo, Samuel G. Lambrakos,** U.S. Naval Research Lab. (United States)

13454-45
Method for calibrating photogrammetric parameters in the calculation of spatial coordinates based on matrix coordinates of depicted objects
Author(s): **Maretta Kazaryan,** North Ossetian State Medical Academy (Russian Federation); **Andrey Richter,** Research Institute of Aerospace Monitoring "AEROCOSMOS" (Russian Federation); **Sergey Chuklinc,** Saint Petersburg State University (Russian Federation); **Mikhail Shahramanyan,** Financial Univ. (Russian Federation); **Alexander Zelensky,** Scientific-Manufacturing Complex «Technological Centre» (Russian Federation); **Prohor Karlov,** Moscow State Univ. of Technology "STANKIN" (Russian Federation)

13454-46
Researching recreational areas from space to identify emergency situations using Earth observation and image processing technologies
Author(s): **Maretta Kazaryan,** North Ossetian State Medical Academy (Russian Federation); **Mikhail Shahramanyan,** Financial Univ. (Russian Federation); **Alexander Zelensky,** Scientific-Manufacturing Complex «Technological Centre» (Russian Federation); **Prohor Karlov,** Moscow State Univ. of Technology "STANKIN" (Russian Federation)

CONFERENCE 13455

Algorithms, Technologies, and Applications for Multispectral and Hyperspectral Imaging XXXI

15 - 17 April 2025 | Captiva 1, Ballroom Level

Conference Chair(s): **Miguel Velez-Reyes,** The Univ. of Texas at El Paso (United States); **David W. Messinger,** Rochester Institute of Technology (United States)

Program Committee: **Michael T. Eismann**, **Joseph Meola,** Air Force Research Lab. (United States); **Alan P. Schaum,** U.S. Naval Research Lab. (United States); **Torbjøm Skauli,** Univ. of Oslo (Norway); **James Theiler, Amanda K. Ziemann,** Los Alamos National Lab. (United States)

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

OPENING REMARKS

15 April 2025 • 11:00 AM - 11:10 AM | Captiva 1, Ballroom Level
Session Chair(s): **Miguel Velez-Reyes**, The Univ. of Texas at El Paso (United States)
Opening remarks for Algorithms, Technologies, and Applications for Multispectral and Hyperspectral Imaging XXXI.

SESSION 1: SENSOR DESIGN, DEVELOPMENT, AND CALIBRATION I

15 April 2025 • 11:10 AM - 12:00 PM | Captiva 1, Ballroom Level
Session Chair(s): **Miguel Velez-Reyes**, The Univ. of Texas at El Paso (United States)

13455-1 • 11:10 AM - 11:40 AM
The IEEE P4001 standard for hyperspectral imaging *(Invited Paper)*
Author(s): **Torbjøm Skauli,** Univ. of Oslo (Norway), Norwegian Defense Research Institute (FFI) (Norway); **John R. Gilchrist,** Clyde Hyperspectral Imaging and Technology Ltd. (United Kingdom); **Christopher Durell,** Labsphere, Inc. (United States)

13455-3 • 11:40 AM - 12:00 PM
An ultra-compact longwave infrared hyperspectral imaging system
Author(s): **Jay P. Giblin**, **Michael Chase,** Physical Sciences Inc. (United States); **Jacob Martin, Nathan Wurst,** Air Force Research Lab. (United States)

Lunch/Exhibition Break 12:00 PM - 1:30 PM

SESSION 2: SENSOR DESIGN, DEVELOPMENT, AND CALIBRATION II

15 April 2025 • 1:30 PM - 3:10 PM | Captiva 1, Ballroom Level
Session Chair(s): **Torbjøm Skauli**, Univ. of Oslo (Norway)

13455-4 • 1:30 PM - 1:50 PM
Effects of spectral and spatial under-sampling in hyperspectral imaging
Author(s): **Hannu Holma**, **Ilkka Kormano**, **Timo Kolehmainen, Paulus Saari,** Specim Spectral Imaging Ltd. (Finland)

13455-5 • 1:50 PM - 2:10 PM
Factors influencing the reflectance spectra of hyperspectral endoscopes (HySEs) and the role of normalization
Author(s): **Siavash Mazdeyasna**, **Mohammed Shahriar Arefin**, **Andrew Fales,** U.S. Food and Drug Administration (United States); **Silas J. Leavesley,** Univ. of South Alabama (United States); **Joshua Pfefer, Quanzeng Wang,** U.S. Food and Drug Administration (United States)

13455-6 • 2:10 PM - 2:30 PM
Differentiability-Oriented Multispectral Sensor Optimization
Author(s): **Jiahe Li,** Univ. of Missouri (United States); **Erick G. Pérez**, **Ed Kinzel,** Univ. of Notre Dame (United States); **Mahmoud Almasri, Derek T. Anderson,** Univ. of Missouri (United States)

13455-7 • 2:30 PM - 2:50 PM
Phase correction of pyroelectric Fourier-transform spectrometers
Author(s): **Ryan Petersburg,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

13455-8 • 2:50 PM - 3:10 PM
Relative radiometric calibration using side-slither technique for SDGSAT-1 multispectral data
Author(s): **Hao Zhang**, **Zhenzhen Cui**, **Bing Zhang, Jianmin Zhou,** Aerospace Information Research Institute (China)

Coffee Break 3:10 PM - 3:40 PM

SESSION 3: SPECTRAL IMAGING WITH UASS

15 April 2025 • 3:40 PM - 4:30 PM | Captiva 1, Ballroom Level
Session Chair(s): **Amanda K. Ziemann**, Los Alamos National Lab. (United States)

13455-9 • 3:40 PM - 4:10 PM
Next-gen UAV hyperspectral processing: transforming UAV platforms into real-time end-user solutions with 3D hypermesh creation
(Invited Paper)
Author(s): **Trond Løke,** Norsk Elektro Optikk AS (Norway); **Agnar Sivertsen**, **Daniel Stødle**, **Sigurd Løkse,** NORCE Norwegian Research Ctr. AS (Norway); **Axel Bohman,** Norsk Elektro Optikk AS (Norway); **Daniel Schläfpher,** ReSe Applications LLC (Switzerland)

13455-11 • 4:10 PM - 4:30 PM
Exploring UAS imaging modalities for precision agriculture: predicting table beet root yield and disease severity estimation using multispectral, hyperspectral, and LiDAR
Author(s): **Mohammad S. Saif**, **Robert Chancia,** Rochester Institute of Technology (United States); **Sean P. Murphy**, **Sarah Pethybridge,** Cornell Univ. (United States); **Jan van Aardt,** Rochester Institute of Technology (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13455-35 • 5:30 PM - 7:00 PM
Custom hyperspectral imaging scanner for microplastic detection and classification: hardware and data processing specifications
Author(s): **Silvia Serranti**, **Giuseppe Bonifazi**, **Giuseppe Capobianco**, **Eleonora Gorga,** Sapienza Univ. di Roma (Italy); **Maurizio D'Agostini, Alberto Dall'Ava,** DV s.r.l. (Italy)

13455-36 • 5:30 PM - 7:00 PM
Hyperspectral imaging in the short-wave infrared range for rapid detection of PFAS in Cannabis sativa L. during phytoremediation
Author(s): **Giuseppe Capobianco**, **Giuseppe Bonifazi**, **Silvia Serranti**, **Ilaria Capitani,** Sapienza Univ. di Roma (Italy); **Maria Luisa Antenozio**, **Cristina Caissutti,** CNR-Istituto di Ricerca sugli Ecosistemi Terrestri (Italy); **Francesca Maria Caporusso,** Sapienza Univ. di Roma (Italy); **Davide Marzi,** National Biodiversity Future Ctr. (Italy); **Patrizia Brunetti,** CNR-Istituto di Ricerca sugli Ecosistemi Terrestri (Italy)

13455-37 • 5:30 PM - 7:00 PM
Application of hyperspectral imaging for identifying polymer blends in polypropylene flexible packaging waste for enhanced recycling
Author(s): **Giuseppe Bonifazi**, **Giuseppe Capobianco**, **Paola Cucuzza, Silvia Serranti,** Sapienza Univ. di Roma (Italy)

Wednesday 16 April 2025

OPENING REMARKS

16 April 2025 • 8:30 AM - 8:40 AM | Captiva 1, Ballroom Level
Session Chair(s): **Michael T. Eismann**, Air Force Research Lab. (United States)
Opening remarks for Algorithms, Technologies, and Applications for Multispectral and Hyperspectral Imaging XXXI.

SESSION 4: APPLICATIONS OF SPECTRAL SENSING AND IMAGING

16 April 2025 • 8:40 AM - 10:00 AM | Captiva 1, Ballroom Level
Session Chair(s): **Michael T. Eismann**, Air Force Research Lab. (United States)

13455-12 • 8:40 AM - 9:00 AM
Full spectrum hyperspectral imaging for heritage science
Author(s): **David W. Messinger,** Rochester Institute of Technology (United States); **Andrew Beeby,** Durham Univ. (United Kingdom)

13455-13 • 9:00 AM - 9:20 AM
Snapshot HSI video implications for ground reconnaissance and autonomous navigation
Author(s): **Nikhil Jawade**, **Elvira Castello**, **James Whicker**, **Christopher Wood**, **Laura Brooks**, **Kenton Kwok**, **Daniel A. C. Pearce, Steve Chappell,** Living Optics (United Kingdom)

13455-14 • 9:20 AM - 9:40 AM
Automated atmospheric compensation and target detection algorithm for standoff detection
Author(s): **Brenda M. Forland,** Pacific Northwest National Lab. (United States); **Neal B. Gallagher,** Eigenvector Research, Inc. (United States); **Timothy J. Johnson,** Pacific Northwest National Lab. (United States)

13455-15 • 9:40 AM - 10:00 AM
Exploiting multi-view hyperspectral imagery over time for activity pattern analysis
Author(s): **Allison Chan**, **Amber Whelsky,** Los Alamos National Lab. (United States); **Frank Qiu**, **Alan Van Omen**, **John van der Laan,** Sandia National Labs. (United States); **Eric Flynn,** Los Alamos National Laboratory (United States); **Amanda Ziemann,** Los Alamos National Lab. (United States); **Dylan Anderson,** Sandia National Labs. (United States)

Coffee Break 10:00 AM - 10:30 AM

SESSION 5: SYNTHETIC DATA FOR MULTISPECTRAL AND HYPERSPECTRAL IMAGING: JOINT SESSION WITH CONFERENCES 13455 AND 13459

16 April 2025 • 10:30 AM - 11:50 AM | Captiva 1, Ballroom Level
Session Chair(s): **David W. Messinger**, Rochester Institute of Technology (United States); **Keith F. Prussing**, Georgia Tech Research Institute (United States)

13459-28 • 10:30 AM - 10:50 AM
Automated multi spectral synthetic data generation and model training toolchain for rapid creation of datasets and models for commercial perception systems and defense ATR and situational awareness electro optical systems
Author(s): **Arthur Stout,** Teledyne FLIR LLC (United States); **Mario Aguilar-Simon, Ryan C. Brown,** Teledyne Scientific Co. (United States)

13455-16 • 10:50 AM - 11:10 AM
Enhancing cross-sensor data integration through domain conversion of satellite imagery with hyperparameter optimized machine learning
Author(s): **Andrew J. Lew**, **Ethan Brewer**, **Timothy Perkins**, **Paul Corlies**, **James H. Grassi,** Spectral Sciences, Inc. (United States); **Jacob Marks**, **Alex Friedman**, **Laila S. Jeong,** Air Force Research Lab. (United States); **Robert Sundberg,** Spectral Sciences, Inc. (United States)

13459-29 • 11:10 AM - 11:30 AM
Generating synthetic hyperspectral imagery using open-source tools
Author(s): **Christopher Liberatore,** Air Force Research Lab. (United States); **Tyler Thompson**, **Andy Klawa,** Riverside Research (United States); **Michael Gableman,** Air Force Research Lab. (United States)

13455-17 • 11:30 AM - 11:50 AM
Band selection for hyperspectral imaging using occlusion-based neural network optimization
Author(s): **Mutian Zhuang,** Marquette Univ. (United States); **Bradley M. Ratliff,** Univ. of Dayton (United States); **Majeed M. Hayat,** Marquette Univ. (United States)

Lunch/Exhibition Break 11:50 AM - 1:20 PM

SESSION 6: KEYNOTE SESSION

16 April 2025 • 1:20 PM - 2:00 PM | Captiva 1, Ballroom Level
Session Chair(s): **Miguel Velez-Reyes**, The Univ. of Texas at El Paso (United States)

13455-18 • 1:20 PM - 2:00 PM
Early results from the tanager hyperspectral mission (Keynote Presentation) *(Invited Paper)*
Author(s): **Mark S. Keremedjiev**, **Keely Roth**, **Geert Barentsen**, **Justin Haag**, **Hannah Bourne**, **Kevin Wurster**, **Minh Radel**, **Trevor Mcdonald**, **Paul Giuliano,** Planet Labs, Inc. (United States); **David Thompson,** Jet Propulsion Lab. (United States); **Jeffrey Guido,** Planet Labs, Inc. (United States); **Riley Duren,** Carbon Mapper, Inc. (United States); **Robert Green, Kirk Seaman,** Jet Propulsion Lab. (United States)

SESSION 7: AI/ML APPLICATIONS IN SATELLITE SPECTRAL IMAGING

16 April 2025 • 2:00 PM - 3:20 PM | Captiva 1, Ballroom Level
Session Chair(s): **Joseph Meola**, Air Force Research Lab. (United States)

13455-19 • 2:00 PM - 2:20 PM
Methane plume detection and quantification using EMIT hyperspectral data
Author(s): **Emma Smith**, **Russell Hardie,** Univ. of Dayton (United States); **Joseph Meola,** Air Force Research Lab. (United States)

13455-20 • 2:20 PM - 2:40 PM **(CANCELLED)**
Evaluating peri-urban land use compliance in Cape Town: insights from cloud-based multispectral data and machine learning
Author(s): **Kevin Musungu, Darron Isaacs,** Cape Peninsula Univ. of Technology (South Africa)

13455-21 • 2:40 PM - 3:00 PM
Advancing the monitoring of trees outside forests (TOF) in Nigeria using machine learning and high-resolution earth observation data
Author(s): **Bashir Adamu,** Modibbo Adama Univ. of Technology, Yola (Nigeria)

13455-22 • 3:00 PM - 3:20 PM **(CANCELLED)**
Assessment of urban green spaces using multispectral AI driven models to mitigate urban heat Island effects
Author(s): **Sourav Kumar,** SKUAST-Kashmir (India); **Prashant Rana,** Dr. Yashwant Singh Parmar Univ. of Horticulture and Forestry (India)

Coffee Break 3:20 PM - 3:35 PM

SESSION 8: SPECTRAL SENSING FOR SPACE SITUATIONAL AWARENESS

16 April 2025 • 3:35 PM - 4:35 PM | Captiva 1, Ballroom Level
Session Chair(s): **Miguel Velez-Reyes**, The Univ. of Texas at El Paso (United States)

13455-24 • 3:35 PM - 3:55 PM
Self-supervised methodologies for orbital object characterization
Author(s): **Noah J. Lewis,** National Research Council (United States); **Elena Plis,** Georgia Tech Research Institute (United States); **Jainisha Shah**, **Ryan Beauchemin,** Air Force Research Lab. (United States); **Yulia Kuznetsova,** Assurance Technology Corp. (United States); **Ryan Hoffmann,** Air Force Research Lab. (United States)

13455-25 • 3:55 PM - 4:15 PM
Development of a deep learning model for classification of non-resolved resident space object hyperspectral signatures
Author(s): **Michael G. Gartley**, **Jason Kirkendall,** Rochester Institute of Technology (United States); **Aryzbe Najera, Miguel Velez-Reyes,** The Univ. of Texas at El Paso (United States)

13455-48 • 4:15 PM - 4:35 PM
Low-dimensional encodings for unsupervised classification of unresolved space objects
Author(s): **Luis R. Cedillo**, **Miguel Velez-Reyes,** The Univ. of Texas at El Paso (United States); **Dan F. DeBlasio,** Carnegie Mellon Univ. (United States)

Thursday 17 April 2025

OPENING REMARKS

17 April 2025 • 8:40 AM - 8:50 AM | Captiva 1, Ballroom Level
Session Chair(s): **James P. Theiler**, Los Alamos National Lab. (United States)
Opening remarks for Algorithms, Technologies, and Applications for Multispectral and Hyperspectral Imaging XXXI.

SESSION 9: SPECTRAL IMAGE PROCESSING

17 April 2025 • 8:50 AM - 10:30 AM | Captiva 1, Ballroom Level
Session Chair(s): **James P. Theiler**, Los Alamos National Lab. (United States)

13455-27 • 8:50 AM - 9:10 AM
Radiometric Assessment of Hypersharpening using a Detail-Injection Convolutional Neural Network on Cultural Heritage Datasets
Author(s): **Jose Nazareno Gabriel M. Macalintal**, **Amir Hassanzadeh, David W. Messinger,** Rochester Institute of Technology (United States)

13455-28 • 9:10 AM - 9:30 AM
Evaluation of deep-learning-based approaches for spectral unmixing
Author(s): **Andrew Wernersbach**, **Kedar R. Naik**, **Michelle F. Nilson**, **Matthew D. Fisher, William M. Baugh,** BAE Systems, Inc. (United States)

13455-29 • 9:30 AM - 9:50 AM
Extracting materials spectral signature in very high spatial resolution hyperspectral imagery using a modified PPI (ModPPI)
Author(s): **Ana Cecilia Chavez-Lopez, Miguel Velez-Reyes,** The Univ. of Texas at El Paso (United States)

13455-30 • 9:50 AM - 10:10 AM
Operational surface reflectance products retrieval system for hyperspectral remote sensing satellites of China
Author(s): **Hao Zhang**, **Shuning Zhang**, **Jianmin Zhou**, **Zhengchao Chen, Hongwei Zhang,** Aerospace Information Research Institute (China)

13455-31 • 10:10 AM - 10:30 AM
Glacier motion estimation in the southeast qinghai-tibet plateau based on GF-1 remote sensing data
Author(s): **Jianmin Zhou**, **Hao Zhang, Anxin Lu,** Aerospace Information Research Institute (China)

Coffee Break 10:30 AM - 11:00 AM

SESSION 10: MODELLING OF SPECTRAL DATA

17 April 2025 • 11:00 AM - 11:40 AM | Captiva 1, Ballroom Level
Session Chair(s): **David W. Messinger**, Rochester Institute of Technology (United States)

13455-32 • 11:00 AM - 11:20 AM
Sculpting priors
Author(s): **James Theiler,** Los Alamos National Lab. (United States)

13455-34 • 11:20 AM - 11:40 AM
3D scene understanding of hyperspectral imagery using neural radiance fields and gaussian splatting
Author(s): **Zigfried Hampel-Arias, Tory Carr,** Los Alamos National Lab. (United States)

CLOSING REMARKS

17 April 2025 • 11:40 AM - 11:50 AM | Captiva 1, Ballroom Level
Session Chair(s): **James P. Theiler**, Los Alamos National Lab. (United States)
Closing remarks for Algorithms, Technologies, and Applications for Multispectral and Hyperspectral Imaging XXXI.

CONFERENCE 13456

Algorithms for Synthetic Aperture Radar Imagery XXXII

15 - 16 April 2025 | Tampa 2, Ballroom Level

Conference Chair(s): **Edmund Zelnio,** Air Force Research Lab. (United States); **Frederick D. Garber,** Wright State Univ. (United States)

Program Committee: **Joshua N. Ash,** Wright State Univ. (United States); **David Blacknell,** Defence Science and Technology Lab. (United Kingdom); **Mujdat Cetin,** Univ. of Rochester (United States); **Gil J. Ettinger,** Systems & Technology Research (United States); **David A. Garren,** Naval Postgraduate School (United States); **Benjamin P. Lewis,** Air Force Research Lab. (United States); **Uttam Kumar Majumder,** U.S. Dept. of Defense (United States); **Christopher Paulson,** Air Force Research Lab. (United States); **Brian Rigling,** Univ. of Dayton (United States); **Timothy D. Ross,** Leidos, Inc. (United States)

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

OPENING REMARKS

15 April 2025 • 11:00 AM - 11:10 AM | Tampa 2, Ballroom Level
Session Chair(s): **Edmund G. Zelnio**, Air Force Research Lab. (United States)
Opening remarks for Algorithms for Synthetic Aperture Radar Imagery XXXII.

SESSION 1: 3D RECONSTRUCTION

15 April 2025 • 11:10 AM - 12:00 PM | Tampa 2, Ballroom Level
Session Chair(s): **Jan Rainer M. Jamora**, Air Force Research Lab. (United States)

13456-1 • 11:10 AM - 11:20 AM
3D point cloud generation using interferometric synthetic aperture radar (SAR) for target recognition
Author(s): **Teddy Herrera, David A. Garren,** Naval Postgraduate School (United States)

13456-6 • 11:20 AM - 11:30 AM
3D interpolated cosines imaging and features across spherical, cylindrical, and cubic SAR
Author(s): **Matthew P. Pepin,** Sandia Staffing Alliance, LLC (United States)

13456-19 • 11:30 AM - 11:40 AM
Accurate 3D reconstruction of ice-bed topography via graph transformer
Author(s): **Zesheng Liu, Maryam Rahnemoonfar,** Lehigh Univ. (United States)

13456-22 • 11:40 AM - 11:50 AM
Enhanced GPR 3D SAR imaging using sparse signal recovery and back-projection algorithms for spatially random samplings
Author(s): **Nihat Alperen Dayanir**, **Dryver Huston, Tian Xia,** The Univ. of Vermont (United States)

13456-26 • 11:50 AM - 12:00 PM
Multichannel simultaneous SAR/interferometry via spectral estimation
Author(s): **Alex W. Batts, Brian Rigling,** Univ. of Dayton (United States)

Lunch/Exhibition Break 12:00 PM - 1:40 PM

REMARKS

15 April 2025 • 1:40 PM - 1:50 PM | Tampa 2, Ballroom Level
Session Chair(s): **Edmund G. Zelnio**, Air Force Research Lab. (United States)
Remarks for Algorithms for Synthetic Aperture Radar Imagery XXXII.

SESSION 2: ADVANCED RADAR PROCESSING

15 April 2025 • 1:50 PM - 2:50 PM | Tampa 2, Ballroom Level
Session Chair(s): **Brian D. Rigling**, Univ. of Dayton (United States)

13456-5 • 1:50 PM - 2:00 PM
Passive sensing and image formation via Starlink downlink
Author(s): **Jonathan C. Denton,** Rochester Institute of Technology (United States)

13456-13 • 2:00 PM - 2:10 PM
Diffusion probabilistic models for compressive SAR imaging
Author(s): **Odysseas Pappas**, **Perla Jazmin Mayo Diaz de Leon**, **Andrew Austin, Alin Achim,** Univ. of Bristol (United Kingdom)

13456-14 • 2:10 PM - 2:20 PM
Terahertz SAR measurements of 1/60th scale models for rapid object recognition development
Author(s): **Ryan J. Shaver**, **Jacob Ross**, **Will Coleman,** Etegent Technologies, Ltd. (United States); **Paul Sotirelis**, **Rob Ewing**, **Ben Pierce,** Sensors Directorate, Air Force Research Laboratory (United States); **Tomas Di Fulvio**, **Elliott Brown,** Wright State University Physics Department (United States); **Michael Saville,** Air Force Institute of Technology (United States)

13456-18 • 2:20 PM - 2:30 PM
Phaseless multistatic synthetic aperture radar imaging in the presence of synchronization error
Author(s): **Nazia Afroz Choudhury,** Rensselaer Polytechnic Institute (United States); **Bariscan Yonel,** Univ. at Albany (United States); **Birsen Yazici,** Rensselaer Polytechnic Institute (United States)

13456-25 • 2:30 PM - 2:40 PM
Uncertainty quantification for deep learning-based synthetic aperture radar imaging
Author(s): **Ammar Saleem,** Sabanci Univ. (Turkey); **Canberk Ekmekci, Müjdat Çetin,** Univ. of Rochester (United States)

13456-31 • 2:40 PM - 2:50 PM
Detection and focus of fast movers within SAR imagery data
Author(s): **Robert Dubas, David A. Garren,** Naval Postgraduate School (United States)

SESSION 3: POSTER SESSION I

15 April 2025 • 2:50 PM - 4:20 PM | Tampa 2, Ballroom Level
Session Chair(s): **Edmund G. Zelnio**, Air Force Research Lab. (United States)
Presenters from the day will gather in the conference room to present a poster for Algorithms for Synthetic Aperture Radar Imagery XXXI conference.

SESSION 4: PANEL DISCUSSION I

15 April 2025 • 4:20 PM - 5:00 PM | Tampa 2, Ballroom Level
Session Chair(s): **Edmund G. Zelnio**, Air Force Research Lab. (United States)
Discuss topics from the days oral and poster presentations for Algorithms for Synthetic Aperture Radar Imagery XXXI conference.

Wednesday 16 April 2025

REMARKS

16 April 2025 • 10:50 AM - 11:00 AM | Tampa 2, Ballroom Level
Session Chair(s): **Edmund G. Zelnio**, Air Force Research Lab. (United States)
Remarks for Algorithms for Synthetic Aperture Radar Imagery XXXII.

SESSION 5: AUTOMATIC TARGET RECOGNITION I

16 April 2025 • 11:00 AM - 12:00 PM | Tampa 2, Ballroom Level
Session Chair(s): **Uttam Kumar Majumder**, U.S. Dept. of Defense (United States)

13456-28 • 11:00 AM - 11:10 AM
Noise analysis and mitigation in SAR for robust classification
Author(s): **Jesmin F. Khan,** Tuskegee Univ. (United States); **Uttam Kumar Majumder,** U.S. Dept. of Defense (United States)

13456-3 • 11:10 AM - 11:20 AM
Benchmarking suite for synthetic aperture radar imagery anomaly detection (SARIAD) algorithms
Author(s): **Lucian Chauvin**, **Somil Gupta**, **Angelina Ibarra, Joshua Peeples,** Texas A&M Univ. (United States)

13456-4 • 11:20 AM - 11:30 AM
Patch distribution modeling framework learnable adaptive cosine estimator (PaDiM-LACE) for anomaly detection in synthetic aperture radar imagery
Author(s): **Angelina Ibarra, Joshua Peeples,** Texas A&M Univ. (United States)

13456-7 • 11:30 AM - 11:40 AM
Template formation strategies for SAR ATR
Author(s): **Jacob Ross,** Etegent Technologies, Ltd. (United States); **Shaun Stephens,** Etegent Technologies Ltd. (United States); **Ryan Shaver,** Etegent Technologies (United States)

13456-29 • 11:40 AM - 11:50 AM
Automated workflow for computer vision tasks and model recommendations
Author(s): **Sanjay Marwaha,** SYNTASA (United States)

13456-32 • 11:50 AM - 12:00 PM
Linear separability of the SAR domain gap
Author(s): **Kameron Grubaugh, Matthew Scherreik,** Air Force Research Lab. (United States)

Lunch/Exhibition Break 12:00 PM - 1:30 PM

CLOSING REMARKS

16 April 2025 • 1:30 PM - 1:40 PM | Tampa 2, Ballroom Level
Session Chair(s): **Edmund G. Zelnio**, Air Force Research Lab. (United States)
Closing remarks for Algorithms for Synthetic Aperture Radar Imagery XXXII.

SESSION 6: AUTOMATIC TARGET RECOGNITION II

16 April 2025 • 1:40 PM - 2:50 PM | Tampa 2, Ballroom Level
Session Chair(s): **Nathan Inkawhich**, Air Force Research Lab. (United States)

13456-11 • 1:40 PM - 1:50 PM
Confidence calibration for prediction powered inference and conformal prediction sets in robust open set ATR
Author(s): **Kameron Grubaugh,** Air Force Research Lab. (United States); **Vedran Beganovich,** Rensselaer Polytechnic Institute (United States); **Christopher Ebersole, Mark Ashby,** Air Force Research Lab. (United States)

13456-12 • 1:50 PM - 2:00 PM
Open-set classification and network calibration for multisensor fusion in the transfer learning domain
Author(s): **Sudarshan Chakravarthy,** The Ohio State Univ. (United States); **Kameron Grubaugh**, **Christopher Ebersole**, **Mark Ashby, Edmund Zelnio,** Air Force Research Lab. (United States)

13456-20 • 2:00 PM - 2:10 PM
The comparability of model fusion to measured data in confuser rejection
Author(s): **Conor Flynn,** Rensselaer Polytechnic Institute (United States); **Christopher Ebersole, Edmund Zelnio,** Air Force Research Lab. (United States)

13456-23 • 2:10 PM - 2:20 PM
Replacing measured SAR datasets with augmented synthetic images
Author(s): **Daniel S. Cho**, **Christopher Ebersole, Edmund Zelnio,** Air Force Research Lab. (United States)

13456-24 • 2:20 PM - 2:30 PM
Predictive measures of out-of-domain generalization in SAR image classification
Author(s): **Daniel Cho**, **Christopher Ebersole, Edmund Zelnio,** Air Force Research Lab. (United States)

13456-27 • 2:30 PM - 2:40 PM
SAR image augmentation for automatic target recognition via spectral estimation
Author(s): **Alex W. Batts, Brian Rigling,** Univ. of Dayton (United States)

13456-30 • 2:40 PM - 2:50 PM
Assessing the value of phase to deep SAR ATR via noninferiority testing
Author(s): **Ryan Socha**, **Caleb Parks**, **Susan Gauch,** Univ. of Arkansas (United States); **Matthew Scherreik,** Air Force Research Lab. (United States)

SESSION 7: POSTER SESSION II

16 April 2025 • 2:50 PM - 4:20 PM | Tampa 2, Ballroom Level
Session Chair(s): **Edmund G. Zelnio**, Air Force Research Lab. (United States)
Presenters from the day will gather in the conference room to present a poster for Algorithms for Synthetic Aperture Radar Imagery XXXI conference.

SESSION 8: PANEL DISCUSSION II

16 April 2025 • 4:20 PM - 5:00 PM | Tampa 2, Ballroom Level
Session Chair(s): **Edmund G. Zelnio**, Air Force Research Lab. (United States)
Discuss topics from the days oral and poster presentations for Algorithms for Synthetic Aperture Radar Imagery XXXI conference.

CONFERENCE 13457

Multimodal Image Exploitation and Learning 2025

14 April 2025 | Captiva 1, Ballroom Level

Conference Chair(s): **Sos S. Agaian,** College of Staten Island (United States); **Vijayan K. Asari,** Univ. of Dayton (United States); **Stephen P. DelMarco,** BAE Systems (United States)

Conference Co-Chair(s): **Colleen P. Bailey,** Univ. of North Texas (United States); **Sabah A. Jassim,** The Univ. of Buckingham (United Kingdom)

Program Committee: **David Akopian,** The Univ. of Texas at San Antonio (United States); **Theus H. Aspiras,** Univ. of Dayton (United States); **Ravindrnath C. Cherukuri,** CHRIST (Deemed to be Univ.) (India); **Reiner Creutzburg,** Technische Hochschule Brandenburg (Germany); **Yunbin Deng,** BAE Systems (United States); **Erlan H. Feria,** The City Univ. of New York (United States); **Artyom M. Grigoryan,** The Univ. of Texas at San Antonio (United States); **Balvinder Kaur,** U.S. Army CCDC C5ISR Ctr. Night Vision & Electronic Sensors Directorate (United States); **Thaweesak Trongtirakul,** Rajamangala Univ. of Technology Phra Nakhon (Thailand); **Viacheslav Voronin,** Moscow State Univ. of Technology "STANKIN" (Russian Federation); **Shiqian Wu,** Wuhan Univ. of Science and Technology (China); **Yufeng Zheng,** The Univ. of Mississippi Medical Ctr. (United States)

Monday 14 April 2025

SESSION 1: IMAGE AND VISION PROCESSING

14 April 2025 • 8:00 AM - 10:00 AM | Captiva 1, Ballroom Level
Session Chair(s): **Stephen P. DelMarco**, BAE Systems (United States)

13457-1 • 8:00 AM - 8:20 AM
Mathematical modeling of search probability for attitude recovery in vision aided navigation systems
Author(s): **Stephen P. DelMarco,** BAE Systems (United States)

13457-2 • 8:20 AM - 8:40 AM
Dual excitation-switchable attention for deep video compression
Author(s): **Neetu Sigger**, **Naseer Al-Jawad,** The Univ. of Buckingham (United Kingdom); **Tuan Nguyen,** Univ. of Greenwich (United Kingdom)

13457-3 • 8:40 AM - 9:00 AM
Smart thresholding in color reduction encoding: optimizing information density with PCA-based data retention
Author(s): **Arthur C. Depoian**, **Colleen P. Bailey, Parthasarathy Guturu,** Univ. of North Texas (United States)

13457-4 • 9:00 AM - 9:20 AM
New effective methods of preparation of states of quantum image representation
Author(s): **Artyom M. Grigoryan**, **Alexis A. Gomez,** The Univ. of Texas at San Antonio (United States); **Sos Agaian,** College of Staten Island (United States)

13457-5 • 9:20 AM - 9:40 AM
Exploration of adversarial samples in optical coherence tomography images in ocular disorder detection in vision transformer
Author(s): **Alex Liew,** The Graduate Ctr., CUNY (United States)

13457-6 • 9:40 AM - 10:00 AM
Adversarial vulnerabilities in infrared night-time surveillance: a study using vision transformers
Author(s):

Coffee Break 10:00 AM - 10:30 AM

SESSION 2: INNOVATIVE IMAGING TECHNIQUES

14 April 2025 • 10:30 AM - 12:00 PM | Captiva 1, Ballroom Level
Session Chair(s): **Vijayan K. Asari**, Univ. of Dayton (United States)

13457-7 • 10:30 AM - 11:00 AM
A study of the spectral-cutoff imaging method of multiple scattering in isotropic point-like discrete random media *(Invited Paper)*
Author(s): **Ray-Hon Sun,** Stanford Univ. (United States)

13457-8 • 11:00 AM - 11:20 AM
Multi-scale and gradient-based blind image quality assessment
Author(s): **Viacheslav V. Voronin, Evgenii Semenishchev,** Moscow State Univ. of Technology "STANKIN" (Russian Federation)

13457-9 • 11:20 AM - 11:40 AM
New method of computing the quantum cosine transforms
Author(s): **Artyom M. Grigoryan**, **Alexis A. Gomez,** The Univ. of Texas at San Antonio (United States); **Sos Agaian,** College of Staten Island (United States)

13457-10 • 11:40 AM - 12:00 PM
Improving single-image super-resolution through hyperparameter tuning
Author(s): **Nicholas Chiapputo, Colleen P. Bailey,** Univ. of North Texas (United States)

Lunch Break 12:00 PM - 1:30 PM

SESSION 3: MACHINE LEARNING I

14 April 2025 • 1:30 PM - 3:10 PM | Captiva 1, Ballroom Level
Session Chair(s): **Amir K. Saeed**, Johns Hopkins Univ. Applied Physics Lab., LLC (United States); **Sos S. Agaian**, The Graduate Ctr., CUNY (United States)

13457-11 • 1:30 PM - 2:10 PM
Enhancing environment perception for autonomous driving with quaternion neural networks (Keynote Presentation)
Author(s): **Sos S. Agaian,** The Graduate Ctr., CUNY (United States)

13457-12 • 2:10 PM - 2:30 PM
Enhancing zero-shot classification in chest X-rays via cross-modal representation and attention alignment
Author(s): **Redha Ali,** Cincinnati Children's Hospital Medical Ctr. (United States); **Almabrok Essa,** John Carroll Univ. (United States); **Fatmah Ali,** Engineering and Information Technology Research Ctr. (Libya); **Elmoatazbellah Ben Omar,** Wright State Univ. (United States); **Adel Alshamili,** Engineering and Information Technology Research Ctr. (Libya); **Russell C. Hardie,** Univ. of Dayton (United States); **Ankita Joshi,** Cincinnati Children's Hospital Medical Ctr. (United States)

13457-13 • 2:30 PM - 2:50 PM
A machine learning approach for cough frequency detection from audio recordings
Author(s): **Hongbo Du**, **Niall McGowan, Naseer Al Jawad,** The Univ. of Buckingham (United Kingdom)

13457-14 • 2:50 PM - 3:10 PM
AI-based tools for efficient network communication: transformation and potentials for the global meeting industry
Author(s): **Dirk Hagen,** Hochschule Hannover (Germany); **Klaus Schwarz,** SRH Berlin Univ. of Applied Sciences (Germany); **Reiner M. Creutzburg,** Technische Hochschule Brandenburg (Germany)

Coffee Break 3:10 PM - 3:40 PM

SESSION 4: MACHINE LEARNING II

14 April 2025 • 3:40 PM - 5:20 PM | Captiva 1, Ballroom Level
Session Chair(s): **Stephen P. DelMarco**, BAE Systems (United States)

13457-15 • 3:40 PM - 4:00 PM
Segmenting Arctic regions: a spiking U-Net approach for pixel-wise classification of open water, snow, and melt-ponds
Author(s): **Aqsa Sultana**, **Shaik N. Abouzahra,** Univ. of Dayton (United States); **Steven D. Harbour,** Parallax Advanced Research Corp. (United States); **Theus H. Aspiras, Vijayan K. Asari,** Univ. of Dayton (United States)

13457-17 • 4:00 PM - 4:20 PM
Enhancing situational awareness through hybrid learning: fusing supervised and unsupervised techniques for defense applications
Author(s): **Benjamin M. Rodriguez,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States); **Devin J Ullerick**, **Benjamin A Johnson,** Johns Hopkins University (United States); **Amir K. Saeed,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

13457-18 • 4:20 PM - 4:40 PM
Transformer-based image captioning as a framework for defense applications
Author(s): **Devin J. Ullerick**, **Dzmitry Kasinets,** Johns Hopkins Univ. (United States); **Jayeeta Ghosh**, **Dilshad Akkam Veettil,** Amazon Web Services (United States); **Amir K. Saeed,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States); **Benjamin A. Johnson,** Johns Hopkins Univ. (United States); **Benjamin M. Rodriguez,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

13457-19 • 4:40 PM - 5:00 PM
Sawza-LL network: a lightweight deep learning architecture for efficient low-light image enhancement
Author(s): **Arthur C. Depoian**, **Gavin Halford**, **Colleen P. Bailey, Parthasarathy Guturu,** Univ. of North Texas (United States)

13457-16 • 5:00 PM - 5:20 PM **(CANCELLED)**
Enhancing model interpretability: detecting core and spurious features in vision-language models using counterfactual reasoning
Author(s): **Anjon Basak,** Stormfish Scientific Corp. (United States); **Adrienne Raglin,** DEVCOM Army Research Lab. (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13457-20 • 5:30 PM - 7:00 PM
Automated quality control in textiles: a multimodal AI-driven fabric defect detection system
Author(s): **Karthik Srivathsa P. L., Albin J. Nidhiri**, **Gokulapriya R.,** CHRIST (Deemed to be Univ.) (India); **Azhahia M. Raman,** Virtual Research and Consultancy (India)

13457-21 • 5:30 PM - 7:00 PM
Retinex-based low-light image enhancement with logarithmic color correction
Author(s): **Thaweesak Trongtirakul,** Rajamangala Univ. of Technology Phra Nakhon (Thailand); **Shiqian Wu,** Institute of Advanced Imaging and Display, Henan Academy of Sciences (China); **Sos Agaian,** The Graduate Ctr., CUNY (United States)

13457-22 • 5:30 PM - 7:00 PM
Adaptive AI-driven brain tumor classification: scalable solutions for enhanced precision in medical imaging
Author(s): **Nicholas Esponda**, **Ben Hand, Colleen P. Bailey,** Univ. of North Texas (United States)

13457-23 • 5:30 PM - 7:00 PM
A novel approach to image enhancement using a 2×2 processing model for color-to-grayscale mapping
Author(s): **Artyom M. Grigoryan,** The Univ. of Texas at San Antonio (United States); **Sos S. Agaian,** College of Staten Island, The City Univ. of New York (United States); **Samuel White,** The Univ. of Texas at San Antonio (United States)

13457-24 • 5:30 PM - 7:00 PM
QKAN: an efficient defense against adversarial attacks in adverse weather conditions using Kolmogorov-Arnold quaternion convolutional network
Author(s): **Vladimir A. Franc, Sos Agaian,** The Graduate Ctr., CUNY (United States)

13457-25 • 5:30 PM - 7:00 PM
A machine learning approach for cough frequency detection from audio recording files
Author(s): **Niall McGowan**, **Hongbo Du, Naseer Al Jawad,** The Univ. of Buckingham (United Kingdom)

13457-26 • 5:30 PM - 7:00 PM
Web app security: methodology for evaluating web application penetration testing tools
Author(s): **Harsh Rathod**, **Navaneeth Shivananjappa,** SRH Berlin Univ. of Applied Sciences (Germany); **Reiner M. Creutzburg,** Technische Hochschule Brandenburg (Germany)

13457-27 • 5:30 PM - 7:00 PM
Minor vulnerabilities sparking major ransomware attacks: case Study
Author(s): **Devin Paige**, **Navaneeth Shivananjappa,** SRH Berlin Univ. of Applied Sciences (Germany); **Reiner M. Creutzburg,** Technische Hochschule Brandenburg (Germany)

13457-28 • 5:30 PM - 7:00 PM
Multimodal zero-shot classification for AI applications in cybersecurity
Author(s): **Klaus Schwarz**, **Reiner M. Creutzburg**, **Franziska Schwarz, Kendrick Bollens,** SRH Univ. of Applied Sciences Heidelberg (Germany)

13457-31 • 5:30 PM - 7:00 PM
Assessing dataset quality in TorchGeo: ensuring reliability for machine learning in remote sensing applications
Author(s): **Aidan G. Kurz**, **Arthur C Depoian, Colleen P. Bailey,** Univ. of North Texas (United States)

13457-29 • 5:30 PM - 7:00 PM
Medical image segmentation via adaptive quaternion anisotropic gradient
Author(s): **Viacheslav V. Voronin, Evgenii Semenishchev,** Moscow State Univ. of Technology "STANKIN" (Russian Federation)

13457-30 • 5:30 PM - 7:00 PM
Image enhancement in surveillance applications via multiscale exposure fusion
Author(s): **Viacheslav V. Voronin, Evgenii Semenishchev,** Moscow State Univ. of Technology "STANKIN" (Russian Federation)

CONFERENCE 13458

Real-Time Image Processing and Deep Learning 2025

14 - 15 April 2025 | Osceola Ballroom A, Ballroom Level

Conference Chair(s): **Nasser Kehtarnavaz,** The Univ. of Texas at Dallas (United States); **Mukul V. Shirvaikar,** The Univ. of Texas at Tyler (United States)

Program Committee: **Colleen P. Bailey,** Univ. of North Texas (United States); **Chen Chen,** Univ. of Central Florida (United States); **Christos Grecos,** Arkansas State Univ. (United States); **Eung-Joo Lee,** The Univ. of Arizona (United States); **Mehrube Mehrubeoglu,** Texas A&M Univ. Corpus Christi (United States); **Jounsup Park,** Korea Aerospace Univ. (Korea, Republic of); **Volodymyr Ponomaryov,** Instituto Politécnico Nacional (Mexico); **Yogesh Rawat,** Univ. of Central Florida (United States); **Abhishek Sehgal,** SAMSUNG Research America (United States); **Bogdan Smolka,** Silesian Univ. of Technology (Poland); **Mohammad Zarei,** The MITRE Corp. (United States); **Zhigang Zhu,** The City College of New York (United States)

Monday 14 April 2025

OPENING REMARKS

14 April 2025 • 8:50 AM - 9:00 AM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **Nasser Kehtarnavaz**, The Univ. of Texas at Dallas (United States)
Real-Time Image Processing and Deep Learning 2025 opening remarks.

SESSION 1: REAL-TIME DEEP LEARNING APPLICATIONS I

14 April 2025 • 9:00 AM - 10:00 AM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **Nasser Kehtarnavaz**, The Univ. of Texas at Dallas (United States)

13458-2 • 9:00 AM - 9:15 AM
Learnable 2D Gaussian filters for computationally efficient abdominal organ classification
Author(s): **Sifat Z. Karim**, **Sabyasachi Biswas, John Ball,** Mississippi State Univ. (United States)

13458-3 • 9:15 AM - 9:30 AM
Application of 2D homography for high resolution traffic data collection using CCTV cameras
Author(s): **LinLin Zhang,** Univ. of Missouri (United States); **Xiang Yu,** Univ. of Missouri (United States), CFS Engineers (United States); **Abdulateef Daud,** HDR, Inc. (United States); **Abdul Rashid Mussah,** Jacobs (United States); **Yaw Adu-Gyamfi,** Univ. of Missouri (United States)

13458-4 • 9:30 AM - 9:45 AM
AgriMoistNet: a low-cost CNN-based system for moisture content prediction in livestock feed
Author(s): **Ifeanyi Nwaneri, Daniel Uyeh,** Michigan State Univ. (United States)

13458-5 • 9:45 AM - 10:00 AM
Determining debris flow in waterways through remote sensing, IoT and image analytics
Author(s): **Mehrube Mehrubeoglu,** Texas A&M Univ. Corpus Christi (United States); **Lifford McLauchlan,** Texas A&M Univ.-Kingsville (United States); **Omar Escudero, Hua Zhang,** Texas A&M Univ. Corpus Christi (United States)

Coffee Break 10:00 AM - 10:30 AM

SESSION 2: REAL-TIME DEEP LEARNING APPLICATIONS II

14 April 2025 • 10:30 AM - 11:30 AM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **Mukul V. Shirvaikar**, The Univ. of Texas at Tyler (United States)

13458-6 • 10:30 AM - 10:45 AM
A batch-mode real-time enhanced-CycleGAN data augmentation approach for detection of IC surface defects
Author(s): **Lamia Alam, Nasser Kehtarnavaz,** The Univ. of Texas at Dallas (United States)

13458-7 • 10:45 AM - 11:00 AM
Agri-NET UAV: a drone-captured dataset and model exploration for enhanced plant recognition using low-cost drones
Author(s): **Rishita Bansal,** The Univ. of Texas at Dallas (United States); **Aryan Anand**, **Prabha Sundaravadivel,** The Univ. of Texas at Tyler (United States); **Balakrishnan Prabhakaran,** The Univ. of Texas at Dallas (United States); **Henry A Torbert,** USA-ARS National Soil Dynamics Laboratory (United States)

13458-9 • 11:00 AM - 11:15 AM
IoT devices with image processing and AI for plastic debris detection
Author(s): **Lifford McLauchlan**, **David Hicks,** Texas A&M Univ.-Kingsville (United States); **Mehrube Mehrubeoglu,** Texas A&M Univ. Corpus Christi (United States)

13458-10 • 11:15 AM - 11:30 AM
Enhancing object detection with event-based vision sensors and point cloud processing
Author(s): **Pablo Rangel**, **Mehrube Mehrubeoglu, Mohammed A.S. Shaik,** Texas A&M Univ. Corpus Christi (United States)

Lunch Break 11:30 AM - 1:15 PM

SESSION 3: REAL-TIME METHODS AND ALGORITHMS I

14 April 2025 • 1:15 PM - 2:15 PM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **Mehrube Mehrubeoglu**, Texas A&M Univ. Corpus Christi (United States)

13458-11 • 1:15 PM - 1:30 PM
Satellite edge AI for automated training data collection, transfer learning, and synthetic training data generation
Author(s): **Sarvesh Garimella, Douglas Franz,** MyRadar/ACME AtronOmatic, LLC (United States)

13458-12 • 1:30 PM - 1:45 PM
A comparative study of the AV1, HEVC, and VVC video codecs
Author(s): **Mukul V. Shirvaikar,** The Univ. of Texas at Tyler (United States); **Christos Grecos,** Strathclyde Forensics Ltd. (United Kingdom)

13458-13 • 1:45 PM - 2:00 PM
Energy-efficient real-time image compression for edge devices: an end-to-end deep learning approach
Author(s): **Ben Hand, Colleen P. Bailey,** Univ. of North Texas (United States)

13458-14 • 2:00 PM - 2:15 PM
Efficient surgical scene segmentation using knowledge distillation and TransUNet
Author(s): **Husain Al Yusuf**, **Mohammadreza Saraei, Eung-Joo Lee,** The Univ. of Arizona (United States)

Coffee Break 2:15 PM - 2:45 PM

SESSION 4: REAL-TIME METHODS AND ALGORITHMS II

14 April 2025 • 2:45 PM - 3:30 PM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **Eung-Joo Lee**, The Univ. of Arizona (United States)

13458-15 • 2:45 PM - 3:00 PM
Real-time computer vision and deep learning for 3D environment modeling, camera network calibration, and human-robot interaction using a robot dog
Author(s): **Zhigang Zhu,** The City College of New York (United States); **Jie Gong**, **Chong Di,** Rutgers, The State Univ. of New Jersey (United States); **Eltan Samoylov,** The City College of New York, The City Univ. of New York (United States); **Brandon Vasquez,** The City College of New York (United States); **Haiqiao Liu**, **Shengyuan Feng, Fred Roberts,** Rutgers, The State Univ. of New Jersey (United States)

13458-16 • 3:00 PM - 3:15 PM
Vidpak: high speed lossless scientific video compression
Author(s): **Thomas P. Watson,** The Univ. of Memphis (United States); **Kyle Renshaw,** Univ. of Central Florida (United States); **Eddie Jacobs,** The Univ. of Memphis (United States)

13458-17 • 3:15 PM - 3:30 PM
Assessing deep learning techniques for human driving behavior prediction and analysis
Author(s): **Prakash Duraisamy,** Univ. of Wisconsin-Green Bay (United States)

Coffee Break 3:30 PM - 3:40 PM

SESSION 5: REAL-TIME DEEP LEARNING APPLICATIONS III

14 April 2025 • 3:40 PM - 4:40 PM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **Jie Gong**, Rutgers, The State Univ. of New Jersey (United States)

13458-21 • 3:40 PM - 3:55 PM
Self-supervised 3D human pose estimation in clinical operating rooms using Kolmogorov-Arnold networks
Author(s): **Mohammadreza Mowlai,** The Univ. of Arizona (United States); **Seok Bong Yoo,** Chonnam National Univ. (Korea, Republic of); **Eung-Joo Lee,** The Univ. of Arizona (United States)

13458-22 • 3:55 PM - 4:10 PM
Coaxial drone system for real-time detection, geolocation, and reporting of runway damage on the edge
Author(s): **Zachary Adler**, **Collin Hays**, **Kevin Hall**, **Brian M. Robinson**, **Dylan Stewart**, **Darrell Langford,** Torch Technologies, Inc. (United States); **Robert Diltz,** Air Force Civil Engineer Ctr. (United States)

13458-23 • 4:10 PM - 4:25 PM
Efficient stroke lesion segmentation in MRI using a modified deep learning model
Author(s): **Beatriz P. Garcia-Salgado,** Instituto Politécnico Nacional (Mexico); **Nasser Kehtarnavaz,** The Univ. of Texas at Dallas (United States); **Volodymyr I. Ponomaryov**, **Rogelio Reyes-Reyes,** Instituto Politécnico Nacional (Mexico); **Jose A. Almaraz-Damian,** Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico)

13458-24 • 4:25 PM - 4:40 PM
Ubervvald: Library of face detection for complex CNN optimization
Author(s): **Mihail Gaianu,** Continental Automotive Romania SRL (Romania)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 6: REAL-TIME METHODS AND ALGORITHMS III

15 April 2025 • 11:00 AM - 11:55 AM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **Colleen P. Bailey**, Univ. of North Texas (United States)

13458-25 • 11:00 AM - 11:25 AM
Integration of programmable diffraction with digital neural networks *(Invited Paper)*
Author(s): **Aydogan Ozcan,** UCLA Samueli School of Engineering (United States)

13458-26 • 11:25 AM - 11:40 AM
Guided super-resolution of time-of-flight imaging using multimodal deep learning
Author(s): **Cooper Coldwell**, **Anirban Swakshar**, **Karsten Schnier**, **Sevgi Gurbuz**, **Seongsin M. Kim, Patrick Kung,** The Univ. of Alabama (United States)

13458-27 • 11:40 AM - 11:55 AM
Real-time detection and tracking by an array camera with distributed neural processing
Author(s): **James Skowronek**, **Gordon Hageman, David Brady,** The Univ. of Arizona (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13458-29 • 5:30 PM - 7:00 PM
Towards the generative model-based synthetization and latent space level analysis of 3D MRA dataset
Author(s): **Ruizhe Jiang**, **Paul Salama, Lauren Christopher,** Purdue Univ. in Indianapolis (United States)

13458-30 • 5:30 PM - 7:00 PM
Real-time monitoring and defect detection in textile manufacturing through computer vision
Author(s): **Karthik Srivathsa P. L., Albin J. Nidhiri**, **Gokulapriya R.,** CHRIST (Deemed to be Univ.) (India); **Azhahia M. Raman,** Virtual Research and Consultancy (India)

13458-32 • 5:30 PM - 7:00 PM
Challenges and solutions in automatic detection of Swiss cheese features on Mars using remote sensing techniques
Author(s): **Eduardo Soares Nascimento**, **Renato César dos Santos**, **Guilherme Henrique Barros de Souza**, **Guilherme Pina Cardim,** Univ. Estadual Paulista "Júlio de Mesquita Filho" (Brazil); **Samara Calçado de Azevedo,** Instituto de Recursos Naturais, UNIFEI (Brazil); **Pedro Pina,** Univ. de Coimbra (Portugal); **Erivaldo Antonio da Silva,** Univ. Estadual Paulista "Júlio de Mesquita Filho" (Brazil)

ON-DEMAND POSTERS

The posters listed below are available exclusively for online viewing during the week of SPIE Defense + Commercial Sensing 2025.

13458-28
Improved deep learning dataset generation and processing for synthetic aperture radar image enhancement
Author(s): **Rachel Viger,** U.S. Naval Research Lab. (United States); **Mark Mirotznik,** Univ. of Delaware (United States); **Samuel G. Lambrakos,** U.S. Naval Research Lab. (United States)

CONFERENCE 13459

Synthetic Data for Artificial Intelligence and Machine Learning: Tools, Techniques, and Applications III

14 - 16 April 2025 | Sarasota 3, Ballroom Level

Conference Chair(s): **Kimberly E. Manser**, **Christopher L. Howell,** DEVCOM C5ISR (United States); **Raghuveer M. Rao,** DEVCOM Army Research Lab. (United States)

Conference Co-Chair(s): **Celso De Melo,** DEVCOM Army Research Lab. (United States); **Keith F. Prussing,** Acting Conference Chair 2025 Georgia Tech Research Institute (United States)

Program Committee: **Derek T. Anderson,** Univ. of Missouri (United States); **Ramalingam Chellappa,** Johns Hopkins Univ. (United States); **Dinesh Manocha,** Univ. of Maryland, College Park (United States); **Colin N. Reinhardt,** Naval Information Warfare Ctr. Pacific (United States); **Gregory P. Spell,** Covar, LLC (United States); **Vincent J. Velten,** Air Force Research Lab. (United States)

Monday 14 April 2025

WELCOME AND OPENING REMARKS

14 April 2025 • 8:50 AM - 9:00 AM | Sarasota 3, Ballroom Level
Session Chair(s): **Kimberly E. Manser**, DEVCOM C5ISR (United States)
Welcome and opening remarks for Synthetic Data for Artificial Intelligence and Machine Learning: Tools, Techniques, and Applications III.

SESSION 1: SYNTHETIC DATA FOR AUTONOMOUS NAVIGATION

14 April 2025 • 9:00 AM - 10:00 AM | Sarasota 3, Ballroom Level
Session Chair(s): **Keith F. Prussing**, Georgia Tech Research Institute (United States)

13459-2 • 9:00 AM - 9:20 AM
LiDAR data segmentation for autonomous ground vehicles in adverse weather conditions using deep learning
Author(s): **Lalitha Dabbiru**, **Chris Goodin**, **Daniel Carruth,** Mississippi State Univ. (United States); **Nicklaus Scherer,** API Metrology (United States); **Paramsothy Jayakumar,** U.S. Army Combat Capabilities Development Command (United States)

13459-3 • 9:20 AM - 9:40 AM
Fine-tuning foundation models for off-road autonomy with digital twin simulation.
Author(s): **Felipe Mejia**, **Francesco Leacche,** Duality AI (United States); **Deegan J. Atha**, **Jeffrey A. Edlund**, **Patrick Spieler, Xianmei Lei,** Jet Propulsion Lab. (United States), Caltech (United States)

13459-4 • 9:40 AM - 10:00 AM
Generating synthetic data for autonomous vehicle applications with the MSU autonomous vehicle simulator
Author(s): **Christopher T. Goodin**, **Daniel W. Carruth**, **Sara Fuller**, **Christopher R. Hudson, Lalitha Dabbiru,** Mississippi State Univ. (United States)

Coffee Break 10:00 AM - 10:30 AM

SESSION 2: GENERATIVE AI FOR SYNTHETIC DATA CREATION I

14 April 2025 • 10:30 AM - 11:50 AM | Sarasota 3, Ballroom Level
Session Chair(s): **Keith F. Prussing**, Georgia Tech Research Institute (United States)

13459-5 • 10:30 AM - 10:50 AM
Generative AI methods for synthesis of image data to train AI for automated scene understanding in a military context: a review of opportunities
Author(s): **Ella P. Fokkinga**, **Thijs A. Eker**, **Jan Erik van Woerden,** TNO (Netherlands); **Jean-Michel Witon,** John Cockerill Defense (France);

Simon O. B. Stallinga, TNO (Netherlands); **Arnoud Visser,** University of Amsterdam (Netherlands); **Klamer Schutte, Friso G. Heslinga,** TNO (Netherlands)

13459-6 • 10:50 AM - 11:10 AM
Encoded image latent space analysis
Author(s): **Michael J. Reale,** SUNY Polytechnic Institute (United States); **Jing Lin,** Air Force Research Lab. (United States); **Arnold J. Zumbrun,** Binghamton Univ. (United States)

13459-7 • 11:10 AM - 11:30 AM
AugEvo: evolving augmentations to close the sim-to-real gap for AI
Author(s): **Peter Popescu**, **Logan M. Brenningmeyer**, **Brendan J. Alvey**, **Derek T. Anderson, Phillip Lei,** Univ. of Missouri (United States)

13459-8 • 11:30 AM - 11:50 AM
Generative AI synthetic data for computer vision tasks
Author(s): **Shannon Dutchie**, **Edward Ryan**, **Michael F. Finch**, **Kimberly E. Manser,** DEVCOM C5ISR (United States); **James Uplinger,** DEVCOM Army Research Lab. (United States); **John Vines,** DEVCOM C5ISR (United States); **Robert Nguyen,** Booz Allen Hamilton, Inc. (United States)

Lunch Break 11:50 AM - 1:30 PM

SESSION 3: GENERATIVE AI FOR SYNTHETIC DATA CREATION II

14 April 2025 • 1:30 PM - 2:30 PM | Sarasota 3, Ballroom Level
Session Chair(s): **Keith F. Prussing**, Georgia Tech Research Institute (United States)

13459-10 • 1:30 PM - 1:50 PM
Weed image augmentation using IP-adapter-based deep generative models
Author(s): **Boyang Deng, Yuzhen Lu,** Michigan State Univ. (United States)

13459-11 • 1:50 PM - 2:10 PM
Generative SAR data generation for deep learning systems training
Author(s): **Amir Shirkhodaie**, **Branndon Jones,** Tennessee State Univ. (United States); **Steven Drager, Matthew Anderson,** Air Force Research Lab. (United States)

13459-12 • 2:10 PM - 2:30 PM
Detection of ground targets through transfer learning with generative AI-produced synthetic SAR data
Author(s): **Amir Shirkhodaie**, **Branndon Jones,** Tennessee State Univ. (United States); **Steven Drager, Matthew Anderson,** Air Force Research Lab. (United States)

Coffee Break 2:30 PM - 3:00 PM

SESSION 4: MULTI-MODAL AND MULTI-DOMAIN SYNTHETIC DATA GENERATION TOOLS

14 April 2025 • 3:00 PM - 4:20 PM | Sarasota 3, Ballroom Level
Session Chair(s): **Keith F. Prussing**, Georgia Tech Research Institute (United States)

13459-13 • 3:00 PM - 3:20 PM
A Pytorch-enabled tool for synthetic event camera data generation and algorithm development
Author(s): **Joseph L. Greene,** Georgia Tech Research Institute (United States); **Adrish Kar**, **Ignacio Galindo,** Georgia Institute of Technology (United States); **Elijah Quiles,** Georgia Tech Research Institute (United States); **Elliott Chen,** Georgia Institute of Technology (United States); **Matthew Anderson,** Georgia Tech Research Institute (United States)

13459-15 • 3:20 PM - 3:40 PM
Multimodal synthetic image generation of terrestrial scenes with humans for AI/ML with MuSES
Author(s): **Mark D. Klein**, **Scott C. Gibbs**, **Corey D. Packard**, **Audrey C. Levanen**, **Logan Canull, Weston Early,** ThermoAnalytics, Inc. (United States)

13459-17 • 3:40 PM - 4:00 PM
Introducing a tool for synthetic defect image data generation: enhancing industrial surface inspection
Author(s): **Ole Schmedemann,** Technische Univ. Hamburg-Harburg (Germany)

13459-18 • 4:00 PM - 4:20 PM
SIMPL Multi-Aspect MADD: Rapidly Generating Low-Cost Multi-Aspect Military Data for All-Domains at Scale
Author(s): **Ian McKechnie**, **Leslie M. Collins,** Duke Univ. (United States); **Jordan Malof,** Univ. of Missouri (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

SESSION 5: COUNTER-AI AND SYNTHETIC DATA DETECTION

15 April 2025 • 1:30 PM - 2:00 PM | Sarasota 3, Ballroom Level
Session Chair(s): **Keith F. Prussing**, Georgia Tech Research Institute (United States)

13459-19 • 1:30 PM - 2:00 PM
Developing new solutions for data provenance and deepfake detection using physics, hardware, and machine learning *(Invited Paper)*
Author(s): **Nader Sehatbakhsh**, **Yuan Tian, Achuta Kadambi,** Univ. of California, Los Angeles (United States)

SESSION 6: SYNTHETIC DATA TOOLS FOR IMAGE GENERATION

15 April 2025 • 2:00 PM - 3:00 PM | Sarasota 3, Ballroom Level
Session Chair(s): **Gregory P. Spell**, Covar, LLC (United States)

13459-54 • 2:00 PM - 2:20 PM
Exploring effective synthetic data generation for reduced reliance on large amounts of labeled data
Author(s): **Prasanna Reddy Pulakurthi**, **Majid Rabbani,** Rochester Institute of Technology (United States); **Celso M. De Melo,** DEVCOM Army Research Lab. (United States); **Sohail A. Dianat,** Rochester Institute of Technology (United States); **Raghuveer M. Rao,** DEVCOM Army Research Lab. (United States)

13459-58 • 2:20 PM - 2:40 PM
Enhanced self-directed training (ESDT): dynamic data balancing in regression models
Author(s): **Aaron Dant,** ASRC Federal Mission Solutions (United States); **Steve Kacenjar, Ronald A. Neely,** ASRC Federal Holding, Co. (United States)

13459-59 • 2:40 PM - 3:00 PM
synthetic-to-real domain adaptation for UAV based object detections in trench environment
Author(s): **Phani Ratan Yalamanchili**, **Zhangyu Jin**, **Andrew Feng,** USC Institute for Creative Technologies (United States); **Grant Spellman**, **Michal Harari,** Applied Intuition, Inc. (United States); **James Uplinger, Celso M. De Melo,** DEVCOM Army Research Lab. (United States)

Coffee Break 3:00 PM - 3:20 PM

SESSION 7: SYNTHETIC DATA FOR AERIAL AND SATELLITE APPLICATIONS

15 April 2025 • 3:20 PM - 5:00 PM | Sarasota 3, Ballroom Level
Session Chair(s): **Vincent J. Velten**, Air Force Research Lab. (United States)

13459-20 • 3:20 PM - 3:40 PM
Platform for synthetic geospatial imagery based on structured domain randomization
Author(s): **Peter Shagnea,** AgileView, Inc. (United States); **Matthew Reisman, Kevin LaTourette,** Bedrock Research LLC (United States)

13459-21 • 3:40 PM - 4:00 PM
Rendered.ai and RIT DIRS laboratory: raising the bar in synthetic MSI and HSI data generation
Author(s): **Matt Robinson,** Rendered.ai (United States)

13459-22 • 4:00 PM - 4:20 PM
Satellite imagery: synthetic data configuration and post-processing
Author(s): **Dylan Harkness,** Rendered.ai (United States)

13459-23 • 4:20 PM - 4:40 PM
Vehicle pose estimation via deep learning
Author(s): **Christopher Liberatore,** Air Force Research Lab. (United States); **Troy Boehne,** West Virginia Univ. (United States); **Ian Choi,** Duke Univ. (United States); **Tyler Thompson**, **Andy Klawa,** Riverside Research (United States); **Michael Gableman, Christopher Menart,** Air Force Research Lab. (United States)

13459-24 • 4:40 PM - 5:00 PM
Leveraging generative AI for cross-regional small object detection in satellite imagery
Author(s): **Zheyang Qin**, **Stanislav Panev,** Carnegie Mellon Univ. (United States); **Celso de Melo,** DEVCOM Army Research Lab. (United States); **Shayok Chakraborty,** Florida State Univ. (United States); **Jessica Hodgins, Fernando De la Torre,** Carnegie Mellon Univ. (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13459-38 • 5:30 PM - 7:00 PM
LLM-Based TypeScript generation and asset management for procedural synthesis of scenes and data for AI
Author(s): **Jeffrey Kerley**, **Derek Anderson, Brendan Alvey,** Univ. of Missouri (United States)

13459-40 • 5:30 PM - 7:00 PM
Contextual performance metrics: using synthetic data and automated characterization to contextualize deep neural network performance
Author(s): **Joshua Haley**, **Brandon Kessler**, **Jonathan Nesper**, **Matthew Waldrep,** Elbit Systems of America, LLC (United States); **Jared Cooper, Michael DeVore,** Barron Associates, Inc. (United States)

13459-41 • 5:30 PM - 7:00 PM
Synthetic scene generation for AI/ML training that accounts for system aberrations and environmental effects
Author(s): **Steven Lacava**, **Cameron Krivitski,** Ansys Government Initiatives, Inc. (United States); **Felipe Mercado,** Ansys, Inc. (United States); **Austin Mytych**, **Valerio Viti**, **Craig Miller,** Ansys Government Initiatives, Inc. (United States); **Subodh Chaudhari, Sreekanth Gondipalle,** Ansys, Inc. (United States)

Wednesday 16 April 2025

SYNTHETIC DATA FOR RADAR APPLICATIONS: JOINT SESSION WITH CONFERENCES 13459 AND 13471

16 April 2025 • 8:40 AM - 10:00 AM | Tampa 2, Ballroom Level
Session Chair(s): **Ryan A. Elwell**, DEVCOM C5ISR (United States); **Keith F. Prussing**, Georgia Tech Research Institute (United States)

13471-27 • 8:40 AM - 9:00 AM
Finite element simulation for synthetic imaging in Advanced Imaging Technology (AIT)
Author(s): **James C. Weatherall,** U.S. Dept. of Homeland Security (United States); **Julian M. Gerber,** Oak Ridge Institute for Science and Education (United States); **Jeffrey Barber,** U.S. Dept. of Homeland Security (United States)

13471-28 • 9:00 AM - 9:20 AM
Automatic classification of radar and communication waveforms through interpretable deep learning
Author(s): **Ali Cafer Gurbuz**, **Bruce Hicks**, **Sabyasachi Biswas, John E Ball,** Mississippi State Univ. (United States)

13459-25 • 9:20 AM - 9:40 AM
Methods for bridging the distribution gap between simulated and measured data
Author(s): **Garrett Decker, Matt Young,** RTX Corp. (United States)

13459-27 • 9:40 AM - 10:00 AM
Advanced EM simulation for synthetic RADAR imagery
Author(s): **Michael Blazej, Nathan Kundtz,** Rendered.ai (United States)

Coffee Break 10:00 AM - 10:30 AM

SYNTHETIC DATA FOR MULTISPECTRAL AND HYPERSPECTRAL IMAGING: JOINT SESSION WITH CONFERENCES 13455 AND 13459

16 April 2025 • 10:30 AM - 11:50 AM | Captiva 1, Ballroom Level
Session Chair(s): **David W. Messinger**, Rochester Institute of Technology (United States); **Keith F. Prussing**, Georgia Tech Research Institute (United States)

13459-28 • 10:30 AM - 10:50 AM
Automated multi spectral synthetic data generation and model training toolchain for rapid creation of datasets and models for commercial perception systems and defense ATR and situational awareness electro optical systems
Author(s): **Arthur Stout,** Teledyne FLIR LLC (United States); **Mario Aguilar-Simon, Ryan C. Brown,** Teledyne Scientific Co. (United States)

13455-16 • 10:50 AM - 11:10 AM
Enhancing cross-sensor data integration through domain conversion of satellite imagery with hyperparameter optimized machine learning
Author(s): **Andrew J. Lew**, **Ethan Brewer**, **Timothy Perkins**, **Paul Corlies**, **James H. Grassi,** Spectral Sciences, Inc. (United States); **Jacob Marks**, **Alex Friedman**, **Laila S. Jeong,** Air Force Research Lab. (United States); **Robert Sundberg,** Spectral Sciences, Inc. (United States)

13459-29 • 11:10 AM - 11:30 AM
Generating synthetic hyperspectral imagery using open-source tools
Author(s): **Christopher Liberatore,** Air Force Research Lab. (United States); **Tyler Thompson**, **Andy Klawa,** Riverside Research (United States); **Michael Gableman,** Air Force Research Lab. (United States)

13455-17 • 11:30 AM - 11:50 AM
Band selection for hyperspectral imaging using occlusion-based neural network optimization
Author(s): **Mutian Zhuang,** Marquette Univ. (United States); **Bradley M. Ratliff,** Univ. of Dayton (United States); **Majeed M. Hayat,** Marquette Univ. (United States)

Lunch/Exhibition Break 11:50 AM - 1:30 PM

INFRARED SYNTHETIC DATA FOR AUTOMATIC TARGET RECOGNITION: JOINT SESSION WITH CONFERENCES 13459 AND 13463

16 April 2025 • 1:30 PM - 2:50 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Michael T. Eismann**, Air Force Research Lab. (United States); **Keith F. Prussing**, Georgia Tech Research Institute (United States)

13459-30 • 1:30 PM - 1:50 PM
An evaluation of synthetic infrared image generation tools
Author(s): **Keith F. Prussing,** Georgia Tech Research Institute (United States)

13459-31 • 1:50 PM - 2:10 PM
EO2IR ControlNet: Synthetic Infrared Image Generation for Automatic Target Recognition - Experimental Results in MIST
Author(s): **Luis Bolanos**, **Garrett Urwin**, **Reece Walsh**, **Ryan Clark**, **Jozsef Hamari, Mohsen Zardadi,** TerraSense Analytics (Canada)

13459-32 • 2:10 PM - 2:30 PM
Analysis of synthetic data features: closing the realism gap
Author(s): **Gregory P. Spell**, **Peter Torrione,** Covar, LLC (United States); **Kimberly Manser,** DEVCOM C5ISR (United States)

13463-17 • 2:30 PM - 2:50 PM
Synthetic data-seeded active learning for automated ATR data labeling
Author(s): **Matthew D. Reisman**, **Kevin LaTourette**, **Dominic LeDuc,** Bedrock Research LLC (United States); **Peter Shagnea, Avi Lindenbaum,** AgileView, Inc. (United States)

Coffee Break 2:50 PM - 3:30 PM

SESSION 8: SYNTHETIC ASSETS AND DATASETS

16 April 2025 • 3:30 PM - 5:10 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Gregory P. Spell**, Covar, LLC (United States)

13459-33 • 3:30 PM - 3:50 PM
Modern Novel View Synthesis Algorithms: A Survey
Author(s): **Alexander Berian, Abhijit Mahalanobis,** The Univ. of Arizona (United States)

13459-34 • 3:50 PM - 4:10 PM
HiFiAerial: a photorealistic synthetic dataset with ground truth for dense prediction in aerial imagery
Author(s): **Jack Akers**, **Jeffrey Kerley**, **Daniel Buffum**, **Derek T. Anderson**, **Andrew Buck, James Keller,** Univ. of Missouri (United States)

13459-35 • 4:10 PM - 4:30 PM
Synthetic data pre-training for runway damage assessment
Author(s): **Dylan Stewart**, **Darrell Langford**, **Alex Jones**, **Zachary Adler**, **Brian M. Robinson**, **Woody English,** Torch Technologies, Inc. (United States); **Robert Diltz,** Air Force Civil Engineer Ctr. (United States)

13459-36 • 4:30 PM - 4:50 PM
Enhancing synthetic data generation with drone-based imagery and photogrammetry
Author(s): **Jeffrey I. Wilson,** Deep Data Systems (United States)

13459-37 • 4:50 PM - 5:10 PM
Feasibility of using synthetic videos to train a YOLOv8 model for UAS detection and classification
Author(s): **Luke Spinosa,** Eoptic, Inc. (United States), Rochester Institute of Technology (United States); **Carl Salvaggio,** Rochester Institute of Technology (United States); **Matthew Kremens**, **Pano Spiliotis**, **Nick Cox**, **Dare Bodington,** Eoptic, Inc. (United States); **Jeffery Dank,** Rochester Institute of Technology (United States); **Jason S Babcock,** Eoptic, Inc. (United States)

CONFERENCE 13460

Machine Learning from Challenging Data 2025

14 - 15 April 2025 | Osceola 2, Ballroom Level

Conference Chair(s): **Panagiotis (Panos) Markopoulos,** The Univ. of Texas at San Antonio (United States)

Conference Co-Chair(s): **Bing Ouyang,** Florida Atlantic Univ. (United States), Harbor Branch Oceanographic Institute (United States); **George Sklivanitis,** Florida Atlantic Univ. (United States)

Program Committee: **Fauzia Ahmad,** Temple Univ. (United States); **Gonzalo R. Arce,** Univ. of Delaware (United States); **Colleen P. Bailey,** Univ. of North Texas (United States); **Ali Cafer Gurbuz,** Mississippi State Univ. (United States); **Ying Liu,** Santa Clara Univ. (United States); **Dimitris A. Pados,** Florida Atlantic Univ. (United States); **Ashley Prater-Bennette,** Air Force Research Lab. (United States); **Zhijun G. Qiao,** The Univ. of Texas Rio Grande Valley (United States); **Adrian Stern,** Ben-Gurion Univ. of the Negev (Israel)

Monday 14 April 2025

WELCOME AND OPENING REMARKS

14 April 2025 • 9:50 AM - 10:00 AM | Osceola 2, Ballroom Level
Session Chair(s): **Panagiotis P. Markopoulos**, The Univ. of Texas at San Antonio (United States)
Welcome and opening remarks for Machine Learning from Challenging Data 2025.

SESSION 1: ROBUST METHODS

14 April 2025 • 10:00 AM - 11:00 AM | Osceola 2, Ballroom Level
Session Chair(s): **Panagiotis P. Markopoulos**, The Univ. of Texas at San Antonio (United States)

13460-1 • 10:00 AM - 10:20 AM
AI/ML curation of AI/ML training datasets
Author(s): **Shruti Shukla**, **Dimitris A. Pados,** Florida Atlantic Univ. (United States); **Kavita Varma,** Amazon.com, Inc. (United States); **George Sklivanitis,** Florida Atlantic Univ. (United States); **Elizabeth S. Bentley,** Air Force Research Lab. (United States); **Michael J. Medley,** SUNY Polytechnic Institute (United States)

13460-2 • 10:20 AM - 10:40 AM
Dataset profiling for outlier removal
Author(s): **Garrett Cayce, Colleen P. Bailey,** Univ. of North Texas (United States)

13460-4 • 10:40 AM - 11:00 AM
From noise to insight: smartsizing training data for robust AI performance in challenging data environments
Author(s): **Dave Cook,** The Training Data Project (United States), National Geospatial-Intelligence Agency (United States); **Tim Klawa,** The Training Data Project (United States)

Coffee Break 11:00 AM - 11:30 AM

SESSION 2: FEDERATED LEARNING TUTORIAL

14 April 2025 • 11:30 AM - 12:30 PM | Osceola 2, Ballroom Level
Session Chair(s): **George Sklivanitis**, Florida Atlantic Univ. (United States)

13460-5 • 11:30 AM - 12:30 PM
Tutorial: federated learning for decentralized and privacy-preserving machine learning (Keynote Presentation)
Author(s): **Panagiotis Markopoulos,** The Univ. of Texas at San Antonio (United States)

Lunch Break 12:30 PM - 2:00 PM

SESSION 3: COMMUNICATIONS AND ARRAY PROCESSING

14 April 2025 • 2:00 PM - 2:40 PM | Osceola 2, Ballroom Level
Session Chair(s): **Panagiotis P. Markopoulos**, The Univ. of Texas at San Antonio (United States)

13460-6 • 2:00 PM - 2:20 PM
Data-driven direction finding with distributed sparse arrays under calibration errors
Author(s): **Shelley Su, Fauzia Ahmad,** Temple Univ. (United States)

13460-7 • 2:20 PM - 2:40 PM
Quantifying narrowband interference using deep learning models with explainable AI Integration
Author(s): **Bryce S. Hinkley**, **David Akopian,** The Univ. of Texas at San Antonio (United States); **Marius Necsoiu,** DEVCOM Army Research Lab. (United States)

Coffee Break 2:40 PM - 2:55 PM

SESSION 4: KEY APPLICATIONS

14 April 2025 • 2:55 PM - 3:55 PM | Osceola 2, Ballroom Level
Session Chair(s): **Alisa Kunapinun**, Harbor Branch Oceanographic Institute (United States)

13460-10 • 2:55 PM - 3:15 PM
Integrating Bi-LSTM and physics constraint models for improved biomass and water quality prediction in the aquaculture systems
Author(s): **Alisa Kunapinun**, **William Fairman**, **Paul Wills, Bing Ouyang,** Harbor Branch Oceanographic Institute (United States)

13460-12 • 3:15 PM - 3:35 PM
BVI-Mamba: Video Enhancement Using a Visual State-Space Model for Low-Light and Underwater Environments
Author(s): **Guoxi Huang**, **Ruirui Lin**, **Yini Li**, **David Bull, Nantheera Anantrasirichai,** Univ. of Bristol (United Kingdom)

13460-13 • 3:35 PM - 3:55 PM
Enhancing low-light instance segmentation through feature-level denoising
Author(s): **Joanne Lin**, **David Bull, Nantheera Anantrasirichai,** Univ. of Bristol (United Kingdom)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 5: COMPRESSION AND AUGMENTATION

15 April 2025 • 11:00 AM - 12:00 PM | Osceola 2, Ballroom Level
Session Chair(s): **George Sklivanitis**, Florida Atlantic Univ. (United States)

13460-15 • 11:00 AM - 11:20 AM
Optimal illumination pattern for satellite compressive LiDAR using generative AI
Author(s): **Christian Newman-Sanders**, **Andres Ramirez-Jaime**, **Nestor Porras-Diaz,** Univ. of Delaware (United States); **Mark Stephen,** NASA Goddard Space Flight Ctr. (United States); **Gonzalo R. Arce,** Univ. of Delaware (United States)

13460-16 • 11:20 AM - 11:40 AM
LPTNet for Partial Ensemble Compressive Sensing: An Unfolded Formalism
Author(s): **Adrian Stern, Vladislav Kravets,** Ben-Gurion Univ. of the Negev (Israel)

13460-17 • 11:40 AM - 12:00 PM
Learning measurement for classification in compressed domain
Author(s): **Ali Cafer Gurbuz,** North Carolina State Univ. (United States)

Lunch/Exhibition Break 12:00 PM - 1:30 PM

SESSION 6: COMPUTER VISION AND REMOTE SENSING

15 April 2025 • 1:30 PM - 2:30 PM | Osceola 2, Ballroom Level
Session Chair(s): **George Sklivanitis**, Florida Atlantic Univ. (United States)

13460-18 • 1:30 PM - 1:50 PM
Enhancing small object detection in remote sensing with scale-aware augmentation and temporal features embedding
Author(s): **Diana Velychko,** Rochester Institute of Technology (United States); **Panagiotis Markopoulos,** The Univ. of Texas at San Antonio (United States); **Eli Saber, Jamison Heard,** Rochester Institute of Technology (United States)

13460-19 • 1:50 PM - 2:10 PM
Improved fish tracking in underwater images for marine biodiversity monitoring
Author(s): **Chiranjibi Shah,** Northern Gulf Institute, Mississippi State Univ. (United States); **M. M. Nabi,** Western Kentucky Univ. (United States); **Iffat Ara Ebu,** Mississippi State Univ. (United States); **Jack Prior**, **Matthew D. Grossi**, **Matthew D. Campbell**, **Ryan Caillouet**, **Timothy Rowell,** National Marine Fisheries Service (United States); **Farron Wallace,** National Oceanic and Atmospheric Administration (United States); **John E. Ball,** Mississippi State Univ. (United States); **Robert Moorhead,** Northern Gulf Institute, Mississippi State Univ. (United States)

13460-21 • 2:10 PM - 2:30 PM
Deep semi-supervised learning for canopy image-based blueberry detection
Author(s): **Xinyang Mu,** Michigan State Univ. (United States)

SESSION 7: MULTIAGENT PROCESSING AND KEY APPLICATIONS

15 April 2025 • 2:30 PM - 2:50 PM | Osceola 2, Ballroom Level
Session Chair(s): **Alisa Kunapinun**, Harbor Branch Oceanographic Institute (United States)

13460-22 • 2:30 PM - 2:50 PM
A spectral classification framework for multispectral LIDAR using a machine learning model
Author(s): **Bhuvaneswari Ramachandran,** Univ. of West Florida (United States); **William Collins,** SAIC (United States); **Daniel Carvalho,** Air Force Research Lab. (United States); **Richard Martin,** Air Force Institute of Technology (United States); **Christian Keyser,** Air Force Research Lab. (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the SPIE Defense + Commercial Sensing posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13460-11 • 5:30 PM - 7:00 PM

Fourier feature neural networks (FFNN) for modeling terahertz plasma wave oscillations in TeraFETs using hydrodynamic charge transport model

Author(s): **Muhammad Mahmudul M. Hasan, Nezih Pala,** Florida International Univ. (United States)

CONFERENCE 13461

Geospatial Informatics XV

17 April 2025 | Osceola 1, Ballroom Level

Conference Chair(s): **Kannappan Palaniappan,** Univ. of Missouri (United States); **Gunasekaran Seetharaman,** U.S. Naval Research Lab. (United States)

Conference Co-Chair(s): **John M. Irvine,** The MITRE Corp. (United States)

Program Committee: **Derek T. Anderson,** Univ. of Missouri (United States); **Alex Aved**, **Erik Blasch,** Air Force Research Lab. (United States); **Michelle Brennan,** National Geospatial-Intelligence Agency (United States); **Peter J. Doucette,** U.S. Geological Survey (United States); **Hirsh Goldberg,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States); **Joshua D. Harguess,** The MITRE Corp. (United States); **Steven Israel,** National Geospatial-Intelligence Agency (United States); **Raju Namburu,** U.S. Army Engineer Research and Development Ctr. (United States); **Ram M. Narayanan,** The Pennsylvania State Univ. (United States); **Shibin Parameswaran,** Naval Information Warfare Ctr. Pacific (United States); **Raghuveer M. Rao,** DEVCOM Army Research Lab. (United States); **Andreas Savakis,** Rochester Institute of Technology (United States); **Clark N. Taylor,** Air Force Institute of Technology (United States); **Chris M. Ward,** The MITRE Corp. (United States)

Tuesday 15 April 2025

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level

Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13461-21 • 5:30 PM - 7:00 PM
Curvelet framework for multispectral and panchromatic image fusion
Author(s): **Rizwan Ahmed Ansari**, **Cameron Schuler, Timothy Mulrooney,** North Carolina Central Univ. (United States)

13461-22 • 5:30 PM - 7:00 PM
Automated segmentation of agricultural fields using AI/ML techniques: enhancing precision agriculture through remote sensing and image analysis
Author(s): **Sourav Kumar,** Sher-e-Kashmir Univ. of Agricultural Sciences and Technology of Kashmir (India); **Sukirti Sukirti,** Indian Institute of Remote Sensing (India); **Devansh Sharma,** Lakehead Univ. (Canada)

13461-23 • 5:30 PM - 7:00 PM
Evaluation of automated methods for detection of vegetation shadow in remotely sensed imagery
Author(s): **Kristofer Lasko,** Army Geospatial Ctr. (United States)

13461-24 • 5:30 PM - 7:00 PM
Advancing the monitoring of pastoral routes in the North East Nigeria high-resolution earth observation data
Author(s): **Bashir Adamu,** Modibbo Adama Univ. of Technology, Yola (Nigeria)

13461-2 • 5:30 PM - 7:00 PM
Change vector analysis based on an optimal threshold with a postprocessing for flood detection in bitemporal satellite images
Author(s): **Mohamed I. Elbakary, Gabrielle Morgan,** Elizabeth City State Univ. (United States)

13461-51 • 5:30 PM - 7:00 PM
Ukrainian language policy, diachronic linguistic landscape change, and GIS
Author(s): **Ryan J. Scamehorn,** Chiang Mai Univ. (Thailand)

13461-34 • 5:30 PM - 7:00 PM
Video object segmentation and tracking of building structures in aerial motion imagery using deep learning
Author(s): **Elham Soltani Kazemi,** University of Missouri (United States); **Taci Kucukpinar**, **Jaired Collins**, **Juan Mogollon,** Univ. of Missouri (United States); **Richard D. Massaro,** U.S. Army Engineer Research and Development Ctr. (United States); **Kannappan Palaniappan,** Univ. of Missouri (United States)

Thursday 17 April 2025

OPENING REMARKS

17 April 2025 • 9:50 AM - 10:00 AM | Osceola 1, Ballroom Level
Session Chair(s): **Kannappan Palaniappan**, Univ. of Missouri (United States)
Opening remarks for Geospatial Informatics XV.

SESSION 1: GEOSPATIAL METHODS AND APPLICATIONS

17 April 2025 • 10:00 AM - 11:20 AM | Osceola 1, Ballroom Level
Session Chair(s): **Kannappan Palaniappan**, Univ. of Missouri (United States)

13461-3 • 10:00 AM - 10:20 AM
Identification of unprepared landing sites for helicopters using geospatial data
Author(s): **Finn Gandras,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

13461-5 • 10:20 AM - 10:40 AM
ForestGen3D: denoising diffusion for realistic forest tree 3D structure generation
Author(s): **Juan Castorena**, **Rodman Linn,** Los Alamos National Lab. (United States); **Eva L. Loudermilk,** U.S. Dept. of Agriculture (United States)

13461-8 • 10:40 AM - 11:00 AM
Hierarchical loss functions for enhanced object detection in hierarchically structured datasets
Author(s): **Yigit Aytac, Thomas Fasciano,** Amazon Web Services, Inc. (United States)

13461-30 • 11:00 AM - 11:20 AM
Optimizing short-term data association for multiple object tracking
Author(s): **Yashas Kuchimanchi,** Univ. of Florida (United States); **Gani Rahmon,** Univ. of Missouri (United States); **Tania Banerjee,** Univ. of Houston (United States); **Sartaj Sahni,** Univ. of Florida (United States); **Guna Seetharaman,** U.S. Naval Research Lab. (United States); **Kannappan Palaniappan,** Univ. of Missouri (United States)

Lunch/Exhibition Break 11:20 AM - 12:50 PM

SESSION 2: GEOSPATIAL ANALYSIS OF MAN AND THE ENVIRONMENT

17 April 2025 • 12:50 PM - 1:50 PM | Osceola 1, Ballroom Level
Session Chair(s): **Gunasekaran Seetharaman**, U.S. Naval Research Lab. (United States)

13461-11 • 12:50 PM - 1:10 PM
Evaluating broad area search and classification of heavy construction activity from multisource multitemporal satellite image sequences
Author(s): **Christopher R. Ratto**, **Trevor A. Stout**, **Michael T. Kelbaugh**, **Christine D. Piatko, Hirsh R. Goldberg,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

13461-33 • 1:10 PM - 1:30 PM
Real-time risk-aware routing for ground vehicle operations in dense urban environments (DUEs) in the presence of toxic industrial chemicals and materials (TIC/Ms)
Author(s): **Phillip J. Durst,** Bennett Aerospace Inc. (United States); **Pratip Rana,** Old Dominion Univ. (United States); **Michael L. Mayo**, **John G. Green,** U.S. Army Engineer Research and Development Ctr. (United States); **Craig Carrigee,** Oak Ridge Institute for Science and Education (United States); **Kevin R. Pilkiewicz,** U.S. Army Engineer Research and Development Ctr. (United States)

13461-12 • 1:30 PM - 1:50 PM
Computer vision based rock-bolt detection in orthomosaic imagery obtained in GPS-denied environments for mining safety assessments
Author(s): **Kevin Benham**, **Elihu Deneke**, **Nicholas Wright**, **Jeremy Wright**, **Kathryn Mondragon, John VanderLaan,** Sandia National Labs. (United States)

Coffee Break 1:50 PM - 2:20 PM

SESSION 3: UAS, AUTONOMY, AND APPLICATIONS

17 April 2025 • 2:20 PM - 4:00 PM | Osceola 1, Ballroom Level
Session Chair(s): **Gunasekaran Seetharaman**, U.S. Naval Research Lab. (United States)

13461-14 • 2:20 PM - 2:40 PM
explainable llm-based drone autonomy derived from partially observable geospatial data
Author(s): **Daniel Buffum,** Univ. of Missouri System (United States); **Jack Akers**, **Andrew Buck**, **Jeffrey Kerley**, **Derek T. Anderson, James M. Keller,** Univ. of Missouri (United States)

13461-16 • 2:40 PM - 3:00 PM
3D semantic segmentation network for post-disaster assessment with unmanned aerial vehicles
Author(s): **Nhut Le, Maryam Rahnemoonfar,** Lehigh Univ. (United States)

13461-17 • 3:00 PM - 3:20 PM
Deep feature based visual localization with Google street view
Author(s): **Zhixin Li,** Purdue Univ. (United States); **John Anderson,** Army Geospatial Ctr. (United States); **Jie Shan,** Purdue Univ. (United States)

13461-18 • 3:20 PM - 3:40 PM
Bag-of-graph-attributes and sparse graph structures for efficient UAV localization in complex environments
Author(s): **Emma Bennett**, **Kannappan Palaniappan, Filiz Bunyak,** Univ. of Missouri (United States)

13461-19 • 3:40 PM - 4:00 PM
Aerial visual localization through novel applications of Weisfeiler-Lehman graph embeddings
Author(s): **Tom Winterton**, **Emma Bennett**, **Burak Atmaca**, **Kannappan Palaniappan, Filiz Bunyak,** Univ. of Missouri (United States)

ON-DEMAND POSTERS

The posters listed below are available exclusively for online viewing during the week of SPIE Defense + Commercial Sensing 2025.

13461-6
Factors affecting ATR confidence: image quality, scene complexity, and training data
Author(s): **Justin Saye**, **Farzaan Naeem**, **Paul Brown**, **Nazario Irizarry**, **James Tanis**, **Franck O. Ndjakou Njeunje, John M. Irvine,** The MITRE Corp. (United States)

13461-7
Quantifying scene complexity for ML models
Author(s): **Samuel Vilt**, **Paul Brown**, **Nazario Irizarry**, **James Tanis**, **Franck O. Ndjakou Njeunje, John M. Irvine,** The MITRE Corp. (United States)

13461-10
Analysis of African elephants using commercial remote sensing data
Author(s): **Thomas Schill**, **Malinda Frick**, **Matt Boyas**, **Victoria Gammino**, **Gary Bundy, John M. Irvine,** The MITRE Corp. (United States)

CONFERENCE 13462

Dimensional Optical Metrology and Inspection for Practical Applications XIV

16 April 2025 | Sanibel 3, Ballroom Level

Conference Chair(s): **Kevin G. Harding,** Optical Metrology Solutions (United States); **Song Zhang,** Purdue Univ. (United States); **Jae-Sang Hyun,** Yonsei Univ. (Korea, Republic of)

Conference Co-Chair(s): **Beiwen Li,** The Univ. of Georgia (United States); **Andrés G. Marrugo,** Univ. Tecnológica de Bolívar (Colombia)

Program Committee: **Nikola Dudukovic,** Lawrence Livermore National Lab. (United States); **Greg A. Finney,** IERUS Technologies, Inc. (United States); **Steven E. Grantham,** National Institute of Standards and Technology (United States); **Stefan Heist,** Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany); **Aravinda Kar,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States); **Peter Kühmstedt,** Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Martin Landmann,** Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany); **Rongguang Liang,** College of Optical Sciences, The Univ. of Arizona (United States); **Georges T. Nehmetallah,** The Catholic Univ. of America (United States); **Gunther Notni,** Technische Univ. Ilmenau (Germany); **Prem Rachakonda,** National Institute of Standards and Technology (United States); **Lei Tian,** Boston Univ. (United States); **Yajun Wang,** Wuhan Univ. (China); **Jiangtao Xi,** Univ. of Wollongong (Australia); **Xiangchao Zhang,** Fudan Univ. (China); **Zonghua Zhang,** Hebei Univ. of Technology (China); **Chao Zuo,** Nanjing Univ. of Science and Technology (China)

Tuesday 15 April 2025

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level

Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13462-20 • 5:30 PM - 7:00 PM
3-dimensional plenoptic microscopy using a stacked microlens array
Author(s): **Munseob Lee,** Electronics and Telecommunications Research Institute (Korea, Republic of); **Chihoon Kim,** Chonnam National Univ. (Korea, Republic of); **Hyungjun Lim,** Korea Institute of Machinery and Materials (KIMM) (Korea, Republic of)

Wednesday 16 April 2025

OPENING REMARKS

16 April 2025 • 9:00 AM - 9:10 AM | Sanibel 3, Ballroom Level
Session Chair(s): **Jae-Sang Hyun**, Yonsei Univ. (Korea, Republic of)
Opening remarks for Dimensional Optical Metrology and Inspection for Practical Applications XIV.

SESSION 1: METROLOGY CALIBRATION AND ANALYSIS

16 April 2025 • 9:10 AM - 10:40 AM | Sanibel 3, Ballroom Level
Session Chair(s): **Jae-Sang Hyun**, Yonsei Univ. (Korea, Republic of)

13462-1 • 9:10 AM - 9:40 AM
Systematic configuration of 3D geometry acquisition for industrial applications using structured light *(Invited Paper)*
Author(s): **Jae-Sang Hyun,** Yonsei Univ. (Korea, Republic of)

13462-2 • 9:40 AM - 10:00 AM
Single-shot calibration with bi-directional composite pattern and Fourier transform profilometry
Author(s): **Jin-Hyuk Seok, Jae-Sang Hyun,** Yonsei Univ. (Korea, Republic of)

13462-3 • 10:00 AM - 10:20 AM
Enhanced absolute phase unwrapping method for multi-view structured-light system using deep learning
Author(s): **Won-Hoe Kim, Jae-Sang Hyun,** Yonsei Univ. (Korea, Republic of)

13462-6 • 10:20 AM - 10:40 AM
Freeform surface metrology using calibrated multi-spot shear-interferometry
Author(s): **André F. Müller,** BIAS - Bremer Institut für angewandte Strahltechnik GmbH (Germany); **Nikodem Mitura,** Physikalisch-Technische Bundesanstalt (Germany); **Beñat Gutiérrez-Cañas Pazos,** BIAS - Bremer Institut für angewandte Strahltechnik GmbH (Germany); **Gerd Ehret,** Physikalisch-Technische Bundesanstalt (Germany); **Claas Falldorf,** BIAS - Bremer Institut für angewandte Strahltechnik GmbH (Germany); **Ralf B. Bergmann,** BIAS - Bremer Institut für angewandte Strahltechnik GmbH (Germany), Univ. Bremen (Germany)

Coffee Break 10:40 AM - 11:10 AM

SESSION 2: METROLOGY APPLICATIONS I

16 April 2025 • 11:10 AM - 11:50 AM | Sanibel 3, Ballroom Level
Session Chair(s): **Beiwen Li**, The Univ. of Georgia (United States)

13462-7 • 11:10 AM - 11:30 AM
Using far field diffraction for roller gap setting
Author(s): **Kevin G. Harding, Don Welch,** Optical Metrology Solutions LLC (United States)

13462-8 • 11:30 AM - 11:50 AM
Reflection-based active alignment for off-axis optical systems with powered mirrors
Author(s): **Mark E. Green**, **Dzmitry Sazonau, Jordan Hall,** Opto-Alignment Technology, Inc. (United States)

Lunch/Exhibition Break 11:50 AM - 1:20 PM

SESSION 3: METROLOGY APPLICATIONS II

16 April 2025 • 1:20 PM - 2:50 PM | Sanibel 3, Ballroom Level
Session Chair(s): **Kevin G. Harding**, Optical Metrology Solutions LLC (United States)

13462-11 • 1:20 PM - 1:50 PM
Corrosion characterization using fringe projection and surface analysis *(Invited Paper)*
Author(s): **Beiwen Li,** The Univ. of Georgia (United States)

13462-12 • 1:50 PM - 2:10 PM
Tree height measurement with iPhone embedded sensors
Author(s): **Wang Xiang**, **Songlin Fei, Song Zhang,** Purdue Univ. (United States)

13462-14 • 2:10 PM - 2:30 PM
Characterization of window materials using out-of-plane BSDF measurements, combining resolution of small-angle scattering and low level background scattering
Author(s): **Peter Apian-Bennewitz,** pab optical consultancy (Germany)

13462-15 • 2:30 PM - 2:50 PM
Investigating the factors that influence 3D stereo depth sensor noise
Author(s): **Terrence C. Pierce, Prem Rachakonda,** National Institute of Standards and Technology (United States)

Coffee Break 2:50 PM - 3:20 PM

SESSION 4: NEW METROLOGY METHODS

16 April 2025 • 3:20 PM - 4:40 PM | Sanibel 3, Ballroom Level
Session Chair(s): **Song Zhang**, Purdue Univ. (United States)

13462-16 • 3:20 PM - 3:40 PM
A phase-shift triangulation gage
Author(s): **Kevin G. Harding,** Optical Metrology Solutions LLC (United States)

13462-17 • 3:40 PM - 4:00 PM
A mapping autocollimator using phase measurement
Author(s):

13462-18 • 4:00 PM - 4:20 PM
Line-scan hyperspectral 4D imaging across visible to shortwave infrared spectral range
Author(s): **Jiaqiong Li, Beiwen Li,** The Univ. of Georgia (United States)

13462-19 • 4:20 PM - 4:40 PM
High-resolution tactile sensor for 3D surface measurement using structured light system
Author(s): **Ingu Yeo, Jae-Sang Hyun,** Yonsei Univ. (Korea, Republic of)

CONFERENCE 13463

Automatic Target Recognition XXXV

14 - 16 April 2025 | Osceola 3, Ballroom Level

CONFERENCE CO-SPONSORS

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Conference Chair(s): **Kenny Chen,** Lockheed Martin Missiles and Fire Control (United States); **Riad I. Hammoud,** PlusAI, Inc. (United States); **Timothy L. Overman,** Prime Solutions Group, Inc. (United States)

Program Committee: **Leon Cohen,** Hunter College (United States); **Frederick D. Garber,** Wright State Univ. (United States); **Bing Li,** Lockheed Martin Corp. (United States); **Abhijit Mahalanobis,** The Univ. of Arizona (United States); **Asif Mehmood,** Joint Artificial Intelligence Ctr. (United States); **Robert R. Muise,** Univ. of Central Florida (United States); **Nasser M. Nasrabadi,** West Virginia Univ. (United States); **Saurabh Prasad,** Univ. of Houston (United States); **Vahid R. Riasati,** California State Univ., Northridge (United States); **Cem Safak Sahin,** Systems & Technology Research (United States); **Jason R. Stack,** Office of Naval Research (United States); **Michael Teutsch,** HENSOLDT Optronics GmbH (Germany); **Vincent J. Velten**, **Donald Waagen, Edmund Zelnio,** Air Force Research Lab. (United States)

Monday 14 April 2025

WELCOME AND OPENING REMARKS

14 April 2025 • 8:20 AM - 8:30 AM | Osceola 3, Ballroom Level
Session Chair(s): **Timothy L. Overman**, Prime Solutions Group, Inc. (United States)
Welcome and opening remarks for Automatic Target Recognition XXXV.

SESSION 1: AUTOMATIC TARGET RECOGNITION

14 April 2025 • 8:30 AM - 9:50 AM | Osceola 3, Ballroom Level
Session Chair(s): **Kristen Jaskie**, Prime Solutions Group, Inc. (United States)

13463-1 • 8:30 AM - 8:50 AM
Class-incremental SAR ATR in noisy and adversarial environments
Author(s): **Edison Muci̇llari,** Univ. of Kentucky (United States); **Aswin N. Raghavan, Zachary A. Daniels,** SRI International (United States)

13463-7 • 8:50 AM - 9:10 AM
SAR ATR performance evaluation on spatially perturbed synthetically generated signatures
Author(s): **Steven Senczyszyn,** Michigan Technological Univ. (United States); **Ian Helman,** Michigan Tech Research Institute (United States); **Timothy C. Havens,** Michigan Technological Univ. (United States); **Adam J. Webb,** Michigan Tech Research Institute (United States); **Steven R. Price,** U.S. Army Engineer Research and Development Ctr. (United States)

13463-5 • 9:10 AM - 9:30 AM
An iterative feedback mechanism for improving natural language class descriptions in open-vocabulary object detection
Author(s): **Louis Y. Kim,** Draper Lab. (United States); **Michelle Karker,** The Charles Stark Draper Lab., Inc. (United States); **Victoria Valledor,** Draper Lab. (United States); **Seiyoung C. Lee**, **Karl F. Brzoska,** The Charles Stark Draper Lab., Inc. (United States); **Margaret Duff,** The Charles Stark Draper Laboratory, Inc. (United States); **Anthony Palladino,** The Charles Stark Draper Lab., Inc. (United States)

13463-23 • 9:30 AM - 9:50 AM
Enhancing neuromorphic-based ATR using digital twin-generated synthetic data
Author(s): **Kristen Jaskie**, **Timothy L. Overman, Marv Kleine,** Prime Solutions Group, Inc. (United States)

Coffee Break 9:50 AM - 10:20 AM

PANEL DISCUSSION: MACHINE LEARNING FOR AUTOMATIC TARGET RECOGNITION

14 April 2025 • 10:20 AM - 12:20 PM | Osceola 3, Ballroom Level

View Full Details: spie.org/dcs/ml-for atr-panel

In response to evolving complexities, automatic target recognition (ATR) is seamlessly transitioning into the realm of artificial intelligence (AI), embracing a future marked by innovation and adaptability. The traditional rule-based approaches are giving way to dynamic, data-driven methodologies empowered by AI.

Lunch Break 12:20 PM - 1:50 PM

SESSION 2: DEEP LEARNING AND PERFORMANCE I

14 April 2025 • 1:50 PM - 3:10 PM | Osceola 3, Ballroom Level
Session Chair(s): **Matthew D. Reisman**, Bedrock Research LLC (United States)

13463-2 • 1:50 PM - 2:10 PM
Evaluating deep learning model robustness via out-of-distribution analysis
Author(s): **Donald Waagen,** Air Force Research Lab. (United States); **Don Hulsey,** Dynetics, Inc. (United States); **Katie Rainey**, **Erin Hausmann,** Naval Information Warfare Ctr. Pacific (United States); **David Gray,** Air Force Research Lab. (United States)

13463-12 • 2:10 PM - 2:30 PM **(CANCELLED)**
Comparative analysis of contrastive learning and supervised learning for class separability in latent space
Author(s): **Keefa Nelson**, **Lily Pederson, Randy Peirce,** Air Force Research Lab. (United States)

13463-13 • 2:30 PM - 2:50 PM
A new similarity evaluation method that reflects the characteristics of SAR images based on statistical quality measurement
Author(s): **Taeseung Lee**, **Changhan Park**, **Junyoung Ko**, **Moonsung Huh**, **Byoungjun Kim,** Hanwha Systems Co., Ltd. (Korea, Republic of); **Heewoo Lee**, **Byungtae Oh, Wookyung Lee,** Korea Aerospace Univ. (Korea, Republic of)

13463-26 • 2:50 PM - 3:10 PM
Simultaneous classification of objects and unknown rejection (SCOUR) for infra-red target recognition
Author(s): **Adam Cuellar,** Univ. of Central Florida (United States); **Daniel Brignac**, **Abhijit Mahalanobis,** The Univ. of Arizona (United States); **Wasfy Mikhael,** Univ. of Central Florida (United States)

Coffee Break 3:10 PM - 3:40 PM

SESSION 3: IMAGE AND DATA PROCESSING FOR AUTOMATIC TARGET RECOGNITION I

14 April 2025 • 3:40 PM - 4:40 PM | Osceola 3, Ballroom Level
Session Chair(s): **Kristen Jaskie**, Prime Solutions Group, Inc. (United States)

13463-8 • 3:40 PM - 4:00 PM
Fusing color imagery with unstable AI-derived depth estimates for object detection
Author(s): **Phillip Lei**, **Brendan Alvey**, **Logan Brenningmeyer**, **Thomas Asmar, Derek T. Anderson,** Univ. of Missouri (United States)

13463-10 • 4:00 PM - 4:20 PM
Radar target recognition using graph-based features and GNN
Author(s): **Ismail I. Jouny,** Lafayette College (United States)

13463-14 • 4:20 PM - 4:40 PM
A robust fake SAR image generation method in terms of similarity for time-sensitive emergency targets
Author(s): **Taeseung Lee**, **Moonsung Huh**, **Byoungjun Kim**, **Junyoung Ko, Youngdon Shin,** Hanwha Systems Co., Ltd. (Korea, Republic of)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

OPENING REMARKS

15 April 2025 • 11:00 AM - 11:10 AM | Osceola 3, Ballroom Level
Session Chair(s): **Timothy L. Overman**, Prime Solutions Group, Inc. (United States)
Opening remarks for Automatic Target Recognition XXXV.

SESSION 4: DEEP LEARNING AND PERFORMANCE II

15 April 2025 • 11:10 AM - 12:30 PM | Osceola 3, Ballroom Level
Session Chair(s): **Matthew D. Reisman**, Bedrock Research LLC (United States)

13463-18 • 11:10 AM - 11:30 AM
Towards a Large Language-Vision Question Answering Model for MSTAR Automatic Target Recognition
Author(s): **David F. Ramirez,** Arizona State Univ. (United States); **Timothy L. Overman,** Prime Solutions Group, Inc. (United States); **Kristen Jaskie,** Prime Solutions Group, Inc. (United States), Arizona State Univ. (United States); **Marv Kleine,** Prime Solutions Group, Inc. (United States); **Andreas Spanias,** Arizona State Univ. (United States)

13463-19 • 11:30 AM - 11:50 AM
Analysis of deep learning in automatic target recognition: evolution and emerging trends
Author(s): **Khaled Obaideen,** Univ. of Sharjah (United Arab Emirates); **Alexandre McCafferty-Leroux**, **Waleed Hilal,** McMaster Univ. (Canada); **Mohammad AlShabi,** Univ. of Sharjah (United Arab Emirates); **S. Andrew Gadsden,** McMaster Univ. (Canada)

13463-20 • 11:50 AM - 12:10 PM
Automatic object detection in atmospheric turbulence-affected environments
Author(s): **Paul Hill**, **Nantheera Anantrasirichai**, **Alin Achim, David Bull,** Univ. of Bristol (United Kingdom)

13463-25 • 12:10 PM - 12:30 PM
Adaptive self-supervised vision transformers for multi-sensor automatic target recognition
Author(s): **Sophia Abraham**, **Jonathan Hauenstein, Walter Scheirer,** Univ. of Notre Dame (United States)

Lunch/Exhibition Break 12:30 PM - 2:00 PM

SESSION 5: IMAGE AND DATA PROCESSING FOR AUTOMATIC TARGET RECOGNITION II

15 April 2025 • 2:00 PM - 3:00 PM | Osceola 3, Ballroom Level
Session Chair(s): **Bingcheng C. Li**, Lockheed Martin Corp. (United States)

13463-15 • 2:00 PM - 2:20 PM
Deep embedded multi-view object clustering using aerial images in the wild
Author(s): **Don Yates,** Univ. of West Florida (United States); **Arash Mahyari,** Florida Institute for Human & Machine Cognition (United States); **Hakki Sevil,** Univ. of West Florida (United States); **David Gray,** Air Force Research Laboratory (United States)

13463-21 • 2:20 PM - 2:40 PM
Spatial and spectral combined graph diffusion equation evolution for extreme point detection
Author(s): **Bingcheng C. Li,** Lockheed Martin Corp. (United States)

13463-24 • 2:40 PM - 3:00 PM
Optimizing satellite image classification through super-resolution enhancement of target regions
Author(s): **Ahsan Habib Akash**, **Rizwan Ahamed**, **Nasser M. Nasrabadi**, **Shoaib M. Sami,** West Virginia Univ. (United States); **Stacey F. Jones,** O Analytics Inc. (United States); **Md Mahedi Hasan,** West Virginia Univ. (United States)

Wednesday 16 April 2025

SESSION 6: INFRARED SYNTHETIC DATA FOR AUTOMATIC TARGET RECOGNITION: JOINT SESSION WITH CONFERENCES 13459 AND 13463

16 April 2025 • 1:30 PM - 2:50 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Michael T. Eismann**, Air Force Research Lab. (United States); **Keith F. Prussing**, Georgia Tech Research Institute (United States)

13459-30 • 1:30 PM - 1:50 PM
An evaluation of synthetic infrared image generation tools
Author(s): **Keith F. Prussing,** Georgia Tech Research Institute (United States)

13459-31 • 1:50 PM - 2:10 PM
EO2IR ControlNet: Synthetic Infrared Image Generation for Automatic Target Recognition - Experimental Results in MIST
Author(s): **Luis Bolanos**, **Garrett Urwin**, **Reece Walsh**, **Ryan Clark**, **Jozsef Hamari, Mohsen Zardadi,** TerraSense Analytics (Canada)

13459-32 • 2:10 PM - 2:30 PM
Analysis of synthetic data features: closing the realism gap
Author(s): **Gregory P. Spell**, **Peter Torrione,** Covar, LLC (United States); **Kimberly Manser,** DEVCOM C5ISR (United States)

13463-17 • 2:30 PM - 2:50 PM
Synthetic data-seeded active learning for automated ATR data labeling
Author(s): **Matthew D. Reisman**, **Kevin LaTourette**, **Dominic LeDuc,** Bedrock Research LLC (United States); **Peter Shagnea, Avi Lindenbaum,** AgileView, Inc. (United States)

Coffee/Exhibition Break 2:50 PM - 4:10 PM

SESSION 7: MACHINE LEARNING FOR INFRARED SENSING: JOINT SESSION WITH CONFERENCES 13463 AND 13469

16 April 2025 • 4:10 PM - 5:10 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Michael T. Eismann**, Air Force Research Lab. (United States); **Timothy L. Overman**, Prime Solutions Group, Inc. (United States)

13469-48 • 4:10 PM - 4:30 PM
Multispectral optical zoom camera system using two fix-focus lenses
Author(s): **Martin Gerken,** HENSOLDT Optronics GmbH (Germany)

13463-6 • 4:30 PM - 4:50 PM
Comparing Methods of UAV Detection and Tracking Based on Low-Cost 3D LiDAR
Author(s): **Corentin Lanusse-Malhéné**, **Benjamin Pannetier,** CS Group (France); **Nicolas Rivière,** ONERA (France); **Olivier Bartheye,** Ctr. de Recherche de l'École de l'Air (France); **Anita Schilling,** ONERA (France); **Lionel Gardenal,** CS Group (France)

13463-16 • 4:50 PM - 5:10 PM

Real-time uniform identification in video rate snapshot hyperspectral imaging

Author(s): **Kenton Kwok**, **Daniel A. C. Pearce**, **James Whicker**, **Elvira Castello**, **Nikhil Jawade**, **Chris Wood, Steve Chappell,** Living Optics (United Kingdom)

CONFERENCE 13464

Pattern Recognition and Prediction XXXVI

16 - 17 April 2025 | Tallahassee 3, Ballroom Level

Conference Chair(s): **Mohammad S. Alam,** Minnesota State Univ. (United States); **Vijayan K. Asari,** Univ. of Dayton (United States)

Program Committee: **Ayman Alfalou,** Institut Supérieur d'Electronique du Nord (France); **Khan M. Iftekharuddin,** Old Dominion Univ. (United States); **Mohammad Ataul Karim,** Univ. of Massachusetts Dartmouth (United States); **Thomas T. Lu,** Jet Propulsion Lab. (United States); **Asif Mehmood,** CDAO - Chief Digital and Artificial Intelligence Office (United States); **Sidike Paheding,** Fairfield Univ. (United States); **Andreas E. Savakis,** Rochester Institute of Technology (United States); **Rupert C. D. Young,** Univ. of Sussex (United Kingdom)

Tuesday 15 April 2025

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level

Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13464-30 • 5:30 PM - 7:00 PM
Dynamic noise flooring as a preprocessing technique for the deinterleaving of RADAR pulse data
Author(s): **Hannah C. Blackmore**, **William G. Warren**, **Jared Allanigue, Samuel G. Lambrakos,** U.S. Naval Research Lab. (United States)

13464-60 • 5:30 PM - 7:00 PM
On the sample complexity of pattern recognition and agnostic PAC learning
Author(s): **Bryan Chen,** Louisiana School for Math, Science, and the Arts (United States); **Xinjia Chen,** Northwestern State Univ. (United States); **Hsiao Chun Wu,** Louisiana State Univ. (United States)

13464-32 • 5:30 PM - 7:00 PM
Semantic information refinement network for more precise crowd counting
Author(s): **Xuetao Zou**, **Peng Zhu,** Chongqing Univ. (China); **Mohammad S. Alam,** Minnesota State Univ., Mankato (United States); **Jun Sang,** Chongqing Univ. (China)

13464-33 • 5:30 PM - 7:00 PM
Class-agnostic object counting network with cross-channel interaction and similarity-aware
Author(s): **Xuetao Zou**, **Cheng Qian,** Chongqing Univ. (China); **Mohammad S. Alam,** Minnesota State Univ., Mankato (United States); **Jun Sang,** Chongqing Univ. (China)

13464-34 • 5:30 PM - 7:00 PM
Data limitations and application opportunities for pre-labeling
Author(s): **Lena Nans, Chelsea Mediavilla,** Naval Information Warfare Ctr. Pacific (United States)

13464-35 • 5:30 PM - 7:00 PM
The correlation between personality traits and vaccine hesitancy among African Americans: a case study on focus groups
Author(s): **Prakash Duraisamy,** Univ. of Wisconsin-Green Bay (United States)

13464-36 • 5:30 PM - 7:00 PM
Pedestrian and car detection using RGB and radar multi-modal data with knowledge distillation
Author(s):

13464-37 • 5:30 PM - 7:00 PM
Refinement of computational techniques for X-ray phase and dark-field imaging
Author(s): **Arthur W. Redgate**, **Wadiah Allahyani**, **Jonathan C. Petruccelli, Carolyn A. MacDonald,** Univ. at Albany (United States)

13464-40 • 5:30 PM - 7:00 PM
Scaling and adapting: a multifaceted approach to enhance crowd counting
Author(s): **Mohammad S. Alam,** Minnesota State Univ., Mankato (United States); **Jun Sang**, **Jinhui Yang**, **Yu Ye, Junjie Zhang,** Chongqing Univ. (China)

Wednesday 16 April 2025

SESSION 1: NOVEL PATTERN RECOGNITION TECHNIQUES

16 April 2025 • 8:40 AM - 10:00 AM | Tallahassee 3, Ballroom Level
Session Chair(s): **Mohammad S. Alam**, Minnesota State Univ., Mankato (United States)

13464-2 • 8:40 AM - 9:00 AM
Locate and extend: a geometric deep learning strategy for predicting polar ice layer structures using graph neural networks
Author(s): **Zesheng Liu, Maryam Rahnemoonfar,** Lehigh Univ. (United States)

13464-3 • 9:00 AM - 9:20 AM
SPLAT: SuperPoint labeling by adjacency traversal
Author(s): **Alison Hardie**, **Shaik N. Abouzahra**, **Theus H. Aspiras**, **Vijayan K. Asari,** Univ. of Dayton (United States); **Andrew J. Stokes,** U.S. Air Force (United States); **Brett L. Keaffaber,** Air Force Research Lab. (United States)

13464-4 • 9:20 AM - 9:40 AM
Enhancing security measures: leveraging fuzzy logic integration for prohibited item detection in dual-energy X-ray security inspection
Author(s): **Ozan Yalçin,** Roketsan A.S. (Turkey); **Mehmet Önder Efe,** Hacettepe University (Turkey)

13464-6 • 9:40 AM - 10:00 AM
Classifier-guided diffusion model for seasonal arctic melt pond data generation
Author(s): **Ruixu Liu**, **Aqsa Sultana**, **Theus H. Aspiras**, **Vijayan K. Asari,** Univ. of Dayton (United States); **Ivan Sudakow,** The Open Univ. (United Kingdom); **Lee W. Cooper,** Univ. of Maryland Ctr. for Environmental Science (United States)

Coffee Break 10:00 AM - 10:30 AM

SESSION 2: MACHINE LEARNING BASED RECOGNITION

16 April 2025 • 10:30 AM - 11:40 AM | Tallahassee 3, Ballroom Level
Session Chair(s): **Vijayan K. Asari**, Univ. of Dayton (United States)

13464-7 • 10:30 AM - 11:00 AM
Material identification of anomalies in millimeter-wave synthetic aperture radar security scanners using machine learning
Author(s): **Steven Curran,** Transportation Security Lab. (United States); **Tyler Karns,** Battelle Memorial Institute (United States)

13464-8 • 11:00 AM - 11:20 AM
Video-sequence based action-recognition using V-JEPA for human-robot collaboration
Author(s): **Thomas Lu**, **Edward T. Chow,** Jet Propulsion Lab. (United States); **Bingbing Li,** California State Univ., Northridge (United States); **Leon Gold**, **Luke Cortez,** Jet Propulsion Lab. (United States); **Jared Carrillo,** California State Univ., Northridge (United States)

13464-10 • 11:20 AM - 11:40 AM
Synthetic data augmentation with generative models for improved classification of mine tailings impoundments
Author(s): **Nusrat Zahan**, **Sidike Paheding,** Fairfield Univ. (United States); **Noha Ismail, Thomas Oommen,** The Univ. of Mississippi (United States)

Lunch/Exhibition Break 11:40 AM - 1:30 PM

SESSION 3: NOVEL IMAGING BASED RECOGNITION

16 April 2025 • 1:30 PM - 2:40 PM | Tallahassee 3, Ballroom Level
Session Chair(s): **Sidike Paheding**, Fairfield Univ. (United States)

13464-11 • 1:30 PM - 2:00 PM
Addressing data size challenges of hyperspectral imaging through event-based sensing *(Invited Paper)*
Author(s): **Bjorn Kjellstrand**, **Joshua C. Shank, Christopher Saltonstall,** Sandia National Labs. (United States)

13464-13 • 2:00 PM - 2:20 PM
A robust roof segmentation using noise-resilient convolutional neural network
Author(s): **Prakash Duraisamy,** Univ. of Wisconsin-Green Bay (United States)

13464-31 • 2:20 PM - 2:40 PM
Secure data collection for Keystroke Dynamics.
Author(s): **Michael Manno,** Air Force Research Lab. (United States)

Coffee Break 2:40 PM - 3:10 PM

SESSION 4: GENERATIVE ALGORITHM BASED RECOGNITION

16 April 2025 • 3:10 PM - 4:30 PM | Tallahassee 3, Ballroom Level
Session Chair(s): **Mohammad S. Alam**, Minnesota State Univ., Mankato (United States)

13464-15 • 3:10 PM - 3:30 PM
Demonstration of a modular, inline X-ray diffraction imaging for full-tunnel explosives detection at-speed
Author(s): **David Coccarelli, Joel A. Greenberg,** Quadridox, Inc. (United States)

13464-16 • 3:30 PM - 3:50 PM
Image quality based collaborative learning for diabetic retinopathy detection
Author(s): **Sait Suer**, **Arif Karakas, Mahmut Karakaya,** Kennesaw State Univ. (United States)

13464-17 • 3:50 PM - 4:10 PM
High-resolution Arctic data generation using a separable convolutional diffusion model
Author(s): **Aqsa Sultana**, **Shaik N. Abouzahra**, **Vijayan K. Asari**, **Theus H. Aspiras,** Univ. of Dayton (United States); **Ivan Sudakow,** The Open Univ. (United Kingdom); **Lee W. Cooper,** Univ. of Maryland Ctr. for Environmental Science (United States)

13464-18 • 4:10 PM - 4:30 PM
Triplet loss based deep learning frameworks for off-angle iris recognition
Author(s): **Daniel Tebor, Mahmut Karakaya,** Kennesaw State Univ. (United States)

Thursday 17 April 2025

SESSION 5: RECOGNITION AND DATA ANALYTICS

17 April 2025 • 8:00 AM - 10:00 AM | Tallahassee 3, Ballroom Level
Session Chair(s): **Mahmut Karakaya**, Kennesaw State Univ. (United States)

13464-19 • 8:00 AM - 8:20 AM
Generic Object Detection Via Image Style Transfer Technique for X-Ray Baggage Scanning Devices
Author(s): **Büşra Küçükateş Yalçın**, **Duygu Selin Ak, Şükrücan Taylan Işıkoğlu,** ASELSAN A.S. (Turkey)

13464-20 • 8:20 AM - 8:40 AM
A Systematic Framework for Design of Experiments in System Design: Establishing Order and Relevance in First-Order Analysis
Author(s): **Amir K. Saeed**, **Benjamin M. Rodriguez,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States); **Anthony Trautman,** U.S. Air Force (United States); **Chris Windle,** Johns Hopkins Univ. (United States)

13464-21 • 8:40 AM - 9:00 AM
The novel pathways into robotics: strategies for broadening participation among minorities
Author(s): **Prakash Duraisamy,** Univ. of Wisconsin-Green Bay (United States)

13464-22 • 9:00 AM - 9:20 AM
Enhancing point cloud labeling: a scalable superpoint-based approach for efficient data annotation and analysis
Author(s): **Shaik N. Abouzahra**, **Alison Hardie**, **Theus H. Aspiras**, **Vijayan K. Asari,** Univ. of Dayton (United States); **Andrew J. Stokes, Brett L. Keaffaber,** Air Force Research Lab. (United States)

13464-23 • 9:20 AM - 9:40 AM
Data-driven approaches for reduced gallery editing in face recognition
Author(s): **Deeksha Arun, Patrick J. Flynn,** Univ. of Notre Dame (United States)

13464-24 • 9:40 AM - 10:00 AM
Enhancing object detection in X-ray baggage screening using Kolmogorov-Arnold networks
Author(s): **Duygu Selin Ak**, **Büşra Küçükateş Yalçın, Şükrücan Taylan Işıkoğlu,** ASELSAN A.S. (Turkey)

Coffee Break 10:00 AM - 10:30 AM

SESSION 6: DEEP LEARNING

17 April 2025 • 10:30 AM - 12:10 PM | Tallahassee 3, Ballroom Level
Session Chair(s): **Theus H. Aspiras**, Univ. of Dayton (United States)

13464-25 • 10:30 AM - 10:50 AM
Can we determine water activity in heterogeneous materials: a computer vision approach
Author(s): **Oreofeoluwa A. Akintan, Daniel D. Uyeh,** Michigan State Univ. (United States)

13464-26 • 10:50 AM - 11:10 AM
Melt-pond region segmentation in the Arctic using hierarchical transformers
Author(s): **Aqsa Sultana**, **Vijayan K. Asari**, **Theus H. Aspiras,** Univ. of Dayton (United States); **Ivan Sudakow,** The Open Univ. (United Kingdom); **Lee W. Cooper,** Univ. of Maryland Ctr. for Environmental Science (United States)

13464-28 • 11:10 AM - 11:30 AM
Material analysis with a tabletop, multi-modality X-ray imaging system
Author(s): **Joel A. Greenberg**, **Turner Richmond**, **Emma Tyler**, **Colt Dudley**, **Cullen Peters**, **Daniel Pike**, **Eric Espenhahn**, **Ryan Moody, David Coccarelli,** Quadridox, Inc. (United States)

13464-29 • 11:30 AM - 11:50 AM
Physics-based synthetic data for system design, algorithm development, and virtual testing and evaluation
Author(s): **Joel A. Greenberg, David Coccarelli,** Quadridox, Inc. (United States)

13464-213 • 11:50 AM - 12:10 PM
Leveraging Segment Anything Model 2 (SAM 2) to optimize segmentation for synthetic data quality in high-clutter baggage
Author(s): **Lindsey J. Gray**, **Nathaniel A. Anderson,** Oak Ridge Institute for Science and Education (United States); **Harry M. Haas,** Signature Science, LLC (United States); **Joseph Palma, Duane C. Karns,** U.S. Dept. of Homeland Security (United States)

ON-DEMAND POSTERS

The posters listed below are available exclusively for online viewing during the week of SPIE Defense + Commercial Sensing 2025.

13464-5
Learning-based material preserving dual energy x-ray image super resolution
Author(s): **Raunav Gosh**, **Renu M. Rameshan,** Vehant Technologies Pvt. Ltd. (India); **Arnav Bhavsar,** Indian Institute of Technology Mandi (India)

13464-9
No-reference image quality measure for noisy X-ray images
Author(s): **Krishan Sharma**, **Ram P. Chebrolu, Renu M. Rameshan,** Vehant Technologies Pvt. Ltd. (India)

CONFERENCE 13465

Three-Dimensional Imaging, Visualization, and Display 2025

14 - 16 April 2025 | Sanibel 1, Ballroom Level

Conference Chair(s): **Bahram Javidi,** Univ. of Connecticut (United States)

Conference Co-Chair(s): **Xin Shen,** Univ. of Hartford (United States); **Arun Anand,** Sardar Patel Univ. (India)

Program Committee: **Hong Hua,** College of Optical Sciences, The Univ. of Arizona (United States); **Manuel Martínez-Corral,** Univ. de València (Spain); **Osamu Matoba,** Kobe Univ. (Japan); **Takanori Nomura,** Wakayama Univ. (Japan); **Adrian Stern,** Ben-Gurion Univ. of the Negev (Israel); **Hirotsugu Yamamoto,** Utsunomiya Univ. (Japan)

Monday 14 April 2025

WELCOME AND OPENING REMARKS

14 April 2025 • 8:20 AM - 8:30 AM | Sanibel 1, Ballroom Level
Session Chair(s): **Bahram Javidi**, Univ. of Connecticut (United States)
Welcome and opening remarks for Three-Dimensional Imaging, Visualization, and Display 2025.

SESSION 1: KEYNOTE SESSION I

14 April 2025 • 8:30 AM - 10:00 AM | Sanibel 1, Ballroom Level
Session Chair(s): **Bahram Javidi**, Univ. of Connecticut (United States)

13465-1 • 8:30 AM - 9:00 AM
Three-dimensional bio-imaging of objects behind scattering medium (Keynote Presentation)
Author(s): **Shimon Elkabetz**, **Abhijit Sanjeev, Zeev Zalevsky,** Bar-Ilan Univ. (Israel)

13465-2 • 9:00 AM - 9:30 AM
Pseudo 3D perception by floating 2D image and 3D reconstruction by holography (Keynote Presentation)
Author(s): **Kenji Yamamoto,** Tokushima Univ. (Japan)

13465-3 • 9:30 AM - 10:00 AM
Computational three-dimensional fluorescence imaging through scattering media by the transport of intensity equation (Keynote Presentation)
Author(s): **Osamu Matoba**, **Naru Yoneda**, **Manoj Kumar,** Kobe Univ. (Japan); **Yasuhiro Awatsuji,** Kyoto Institute of Technology (Japan)

Coffee Break 10:00 AM - 10:30 AM

SESSION 2: KEYNOTE SESSION II

14 April 2025 • 10:30 AM - 12:00 PM | Sanibel 1, Ballroom Level
Session Chair(s): **Aristide Dogariu**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

13465-4 • 10:30 AM - 11:00 AM
Sensing with structured optical wavefronts (Keynote Presentation)
Author(s): **Aristide Dogariu,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

13465-5 • 11:00 AM - 11:30 AM
Polarization encoded color imaging in incoherent Fourier ptychography (Keynote Presentation)
Author(s): **Takanori Nomura**, **Yuki Matsumura, Yusuke Saita,** Wakayama Univ. (Japan)

13465-6 • 11:30 AM - 12:00 PM
Realizing science fiction: the evolution and applications of aerial displays (Keynote Presentation)
Author(s): **Hirotsugu Yamamoto,** Utsunomiya Univ. (Japan)

Lunch Break 12:00 PM - 1:30 PM

SESSION 3: 3D IMAGE SENSING SYSTEMS I

14 April 2025 • 1:30 PM - 3:00 PM | Sanibel 1, Ballroom Level
Session Chair(s): **Hirotsugu Yamamoto**, Utsunomiya Univ. (Japan)

13465-7 • 1:30 PM - 2:00 PM
Current progress in lensless holographic microscopy *(Invited Paper)*
Author(s): **Claas Falldorf**, **André Müller,** BIAS - Bremer Institut für angewandte Strahltechnik GmbH (Germany); **Ralf B. Bergmann,** BIAS - Bremer Institut für angewandte Strahltechnik GmbH (Germany), Univ. Bremen (Germany); **Benat Gutierrez-Canas Pazos, Justin Bich,** BIAS - Bremer Institut für angewandte Strahltechnik GmbH (Germany)

13465-9 • 2:00 PM - 2:30 PM
High resolution 3D imaging with structured light: principles and applications *(Invited Paper)*
Author(s): **Jae-Sang Hyun,** Yonsei Univ. (Korea, Republic of)

13465-10 • 2:30 PM - 3:00 PM
Multi-target detection, tracking, and identification using hybrid event-based and frame-based system *(Invited Paper)*
Author(s): **Amit Ashok,** Wyant College of Optical Sciences (United States)

Coffee Break 3:00 PM - 3:30 PM

SESSION 4: BIOMEDICAL APPLICATIONS OF 3D SENSING AND IMAGING

14 April 2025 • 3:30 PM - 4:30 PM | Sanibel 1, Ballroom Level
Session Chair(s): **Osamu Matoba**, Kobe Univ. (Japan)

13465-12 • 3:30 PM - 4:00 PM
Understanding biological dynamics in 3D+t: a time-lapse multifocus microscopy approach *(Invited Paper)*
Author(s): **Julia R. Alonso**, **Alejandro Silva**, **Jimena Hochmann, Miguel Arocena,** Univ. de la República Uruguay (Uruguay)

13465-13 • 4:00 PM - 4:30 PM
Speckle-free digital holographic microscopy with partially spatially coherent light: ultra-high spatial phase sensitivity, high temporal phase stability and large space bandwidth product *(Invited Paper)*
Author(s): **Dalip Singh Mehta,** Indian Institute of Technology Delhi (India)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 5: 3D IMAGING FOR BIOMEDICAL APPLICATIONS

15 April 2025 • 11:00 AM - 12:30 PM | Sanibel 1, Ballroom Level
Session Chair(s): **Takanori Nomura**, Wakayama Univ. (Japan)

13465-14 • 11:00 AM - 11:30 AM
An overview of label-free quantitative holographic live cell imaging for drug toxicity assessment *(Invited Paper)*
Author(s): **Inkyu Moon,** Daegu Gyeongbuk Institute of Science & Technology (Korea, Republic of)

13465-15 • 11:30 AM - 12:00 PM
Depth-enhanced computational microscopy via co-learned binary phase filter and image deconvolution *(Invited Paper)*
Author(s): **Chulmin Joo**, **Baekcheon Seong**, **Younghoon Kim**, **Jinwoo Cho, Dambin Cho,** Yonsei Univ. (Korea, Republic of)

13465-8 • 12:00 PM - 12:30 PM
Advancing computational microscopy by physics-simulator and deep learning *(Invited Paper)*
Author(s): **Lei Tian,** Boston Univ. (United States)

Lunch/Exhibition Break 12:30 PM - 1:40 PM

SESSION 6: INTEGRAL IMAGING, LIGHTFIELD, AND PLENOPTIC IMAGING: ALGORITHMS, HARDWARE, AND SYSTEM

15 April 2025 • 1:40 PM - 3:10 PM | Sanibel 1, Ballroom Level
Session Chair(s): **Zeev Zalevsky**, Bar-Ilan Univ. (Israel)

13465-16 • 1:40 PM - 2:10 PM
Robust light fields denoising with S^{2}N2N *(Invited Paper)*
Author(s): **Adrian Stern**, **Tal Kozakov**, **Omer Hazan, Adir Hazan,** Ben-Gurion Univ. of the Negev (Israel)

13465-18 • 2:10 PM - 2:40 PM
Metasurfaces for 3D imaging and displays: potential and limitations *(Invited Paper)*
Author(s): **Simon Thibault,** Univ. Laval (Canada)

13465-17 • 2:40 PM - 3:10 PM
Phase retrieval by using physics-enhanced deep neural networks *(Invited Paper)*
Author(s): **Guohai Situ,** Shanghai Institute of Optics and Fine Mechanics (China)

Coffee Break 3:10 PM - 3:30 PM

SESSION 7: APPLICATIONS OF OPTICAL DEVICES FOR 3D VISUALIZATION, TV, VIDEO, AND IMAGING SYSTEMS

15 April 2025 • 3:30 PM - 5:00 PM | Sanibel 1, Ballroom Level
Session Chair(s): **Adrian Stern**, Ben-Gurion Univ. of the Negev (Israel)

13465-19 • 3:30 PM - 4:00 PM
Full-color augmented reality displays using metasurface waveguide *(Invited Paper)*
Author(s): **Xiaowei Sun**, **Zhongtao Tian**, **Xiuling Zhu, Philip A. Surman,** Southern Univ. of Science and Technology (China)

13465-20 • 4:00 PM - 4:30 PM
Optical see-through three-dimensional near-eye display with occlusion support *(Invited Paper)*
Author(s): **Jae-Hyeung Park**, **Woongseob Han,** Seoul National Univ. (Korea, Republic of); **Myeong-Ho Choi,** Inter-Univ. Semiconductor Research Ctr., Seoul National Univ. (Korea, Republic of)

13465-22 • 4:30 PM - 5:00 PM
Speckle contrast evaluation: a new concept for optical inspection *(Invited Paper)*
Author(s): **Mostafa Agour**, **Claas Falldorf, Ralf B. Bergmann,** BIAS - Bremer Institut für angewandte Strahltechnik GmbH (Germany)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level

Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13465-32 • 5:30 PM - 7:00 PM
Image-based approach to hand sign translation and implementation
Author(s): **Lucas Slomski**, **Michael Doyle**, **Ying Yu, Xin Shen,** Univ. of Hartford (United States)

13465-33 • 5:30 PM - 7:00 PM
A recursive implementation of the ball-pivoting algorithm
Author(s): **Tess Harris,** Mississippi State Univ. (United States); **Jan Rainer M. Jamora, Elizabeth Sudkamp,** Air Force Research Lab. (United States)

13465-34 • 5:30 PM - 7:00 PM
Double random phase-encoded image reconstruction based on denoising diffusion models
Author(s): **Loaa ElZahar**, **Seonghwan Park, Inkyu Moon,** Daegu Gyeongbuk Institute of Science & Technology (Korea, Republic of)

13465-35 • 5:30 PM - 7:00 PM
Photon-counting imaging with denoising diffusion models
Author(s): **Seonghwan Park, Inkyu Moon,** Daegu Gyeongbuk Institute of Science & Technology (Korea, Republic of)

13465-36 • 5:30 PM - 7:00 PM
A study of point cloud 3D modeling for multi-perspective image processing and visualization
Author(s): **Ryan Haggerty, Xin Shen,** Univ. of Hartford (United States)

13465-37 • 5:30 PM - 7:00 PM
Depth Driven Initialization for Sparse 3D Gaussian Splatting
Author(s): **Thomas Sugg**, **Michelle Jou, Marc Bosch,** Accenture Federal Services (United States)

13465-38 • 5:30 PM - 7:00 PM
Sensor fusion and augmented reality towards enhanced SfM priors for fruit tree reconstruction
Author(s): **Andrew K. Chesang, Daniel Uyeh,** Michigan State Univ. (United States)

13465-39 • 5:30 PM - 7:00 PM
Review of 3D integral imaging in underwater sensing applications
Author(s): **Alex Maric**, **Gokul Krishnan,** Univ. of Connecticut (United States); **Rakesh Joshi,** Univ. of Houston (United States); **Yinuo Huang**, **Kashif Usmani, Bahram Javidi,** Univ. of Connecticut (United States)

13465-40 • 5:30 PM - 7:00 PM
Visualizing heat flow and detecting inhomogeneities in dielectrics via digital holographic interferometry
Author(s): **Vismay Trivedi,** National Institute of Technology, Delhi (India); **Vidhi Singh,** Sardar Patel Univ. (India); **Subhash Utadiya,** The Maharaja Sayajirao Univ. of Baroda (India); **Gyanendra Sheoran,** National Institute of Technology, Delhi (India); **Arun Anand,** Sardar Patel Univ. (India)

13465-41 • 5:30 PM - 7:00 PM
Review of reported methods to decouple the refractive index and thickness from phase measurements reconstructed using digital holographic microscopy (DHM)
Author(s): **Clivens Joseph, Ana Doblas,** Univ. of Massachusetts Dartmouth (United States)

13465-42 • 5:30 PM - 7:00 PM
Using immersive virtual reality for improved outlier detection
Author(s): **Hyrum Redd, John H. Kalivas,** Idaho State Univ. (United States)

13465-43 • 5:30 PM - 7:00 PM
Phase measuring deflectometry for optical thickness mapping of transparent phase objects
Author(s): **Vismay Trivedi**, **Shivam Sharma,** National Institute of Technology, Delhi (India); **Subhash Utadiya,** The Maharaja Sayajirao Univ. of Baroda (India); **Gyanendra Sheoran,** National Institute of Technology, Delhi (India); **Bahram Javidi,** Univ. of Connecticut (United States); **Arun Anand,** Sardar Patel Univ. (India)

13465-44 • 5:30 PM - 7:00 PM
Development of a quantum dot static volumetric projector based on two-photon absorption
Author(s): **Joseph Gaulin**, **Sédick Rabia**, **Béatrice Lessard-Hamel**, **Mathieu Rioux**, **Ehsan Rostamitapehesmaeil**, **Jérôme Lapointe**, **Joy Sankar Roy**, **Denis Brousseau,** Univ. Laval (Canada); **Martin Chartrand**, **Hassan Kassi,** Lux Image Inc. (Canada); **Réal Vallé**, **Frej Mighri**, **Claudine Allen, Simon Thibault,** Univ. Laval (Canada)

13465-45 • 5:30 PM - 7:00 PM
Lensless object sensing and classification in long wave infrared using random phase encoding
Author(s): **Gregory Aschenbrenner**, **Kashif Usmani**, **Saurabh Goswami, Bahram Javidi,** Univ. of Connecticut (United States)

13465-46 • 5:30 PM - 7:00 PM
Lensless high-speed temporally encoded optical signal detection in turbid media
Author(s): **Gregory Aschenbrenner**, **Rakesh Joshi**, **Yinuo Huang, Bahram Javidi,** Univ. of Connecticut (United States)

13465-47 • 5:30 PM - 7:00 PM
Pollen classification in honey samples using digital holographic microscopy and machine learning
Author(s): **Vismay Trivedi**, **Harsh Chatwani,** National Institute of Technology, Delhi (India); **Harsh Solanki,** Sardar Patel Univ. (India); **Gyanendra Sheoran,** National Institute of Technology, Delhi (India); **Bahram Javidi,** Univ. of Connecticut (United States); **Arun Anand,** Sardar Patel Univ. (India)

13465-49 • 5:30 PM - 7:00 PM
Cell phone reader for the detection of urinary albumin utilizing colorimetry and machine learning
Author(s): **Sunita Bhatt, Satish Kumar Dubey,** Indian Institute of Technology Delhi (India)

13465-51 • 5:30 PM - 7:00 PM
Representing point cloud data as binary encodings
Author(s): **Ander Talley, J. Adam Jones,** Mississippi State Univ. (United States)

13465-52 • 5:30 PM - 7:00 PM
Microlens Array-based Plenoptic Microscopy for High-Precision 3D Imaging
Author(s): **Munseob Lee,** Electronics and Telecommunications Research Institute (Korea, Republic of); **Chihoon Kim,** Chonnam National Univ. (Korea, Republic of)

13465-53 • 5:30 PM - 7:00 PM
Real-time aquatic imaging using living animals as light sources for VR biology
Author(s): **Ryosuke Ichikawa**, **Hiroki Takatsuka**, **Kazuaki Takiyama**, **Takehide Ikeda**, **Toru Iwane**, **Shiro Suyama, Hirotsugu Yamamoto,** Utsunomiya Univ. (Japan)

13465-54 • 5:30 PM - 7:00 PM
Overview underwater object detection and temporal signal detection in turbid water using 3D-integral imaging and deep learning
Author(s): **Rakesh Joshi**, **Kashif Usmani**, **Gokul Krishnan,** Univ. of Connecticut (United States); **Fletcher Blackmon,** Saab, Inc. (United States); **Bahram Javidi,** Univ. of Connecticut (United States)

13465-55 • 5:30 PM - 7:00 PM
Overview of longitudinal resolution of three-dimensional integral imaging
Author(s): **Kashif Usmani, Bahram Javidi,** Univ. of Connecticut (United States)

13465-56 • 5:30 PM - 7:00 PM
Enhanced 3D integral imaging profilometry under degraded environmental conditions
Author(s): **Jiheon Lee, Bahram Javidi,** Univ. of Connecticut (United States)

13465-57 • 5:30 PM - 7:00 PM
An overview of three-dimensional integral imaging-based image descattering and recovery using physics informed unsupervised CycleGAN
Author(s): **Gokul Krishnan**, **Saurabh Goswami**, **Rakesh Joshi, Bahram Javidi,** Univ. of Connecticut (United States)

13465-58 • 5:30 PM - 7:00 PM
An overview of a diffuser-based underwater optical signal detection system under degraded environments
Author(s): **Yinuo Huang**, **Gokul Krishnan**, **Saurabh Goswami, Bahram Javidi,** Univ. of Connecticut (United States)

13465-59 • 5:30 PM - 7:00 PM
Free form scans and augmented reality visualization for ground penetrating radar
Author(s): **Scott Tanch**, **Dylan Burns**, **Tian Xia, Dryver R. Huston,** The Univ. of Vermont (United States)

13465-60 • 5:30 PM - 7:00 PM
High-resolution quantitative phase imaging of live cells: an application of nanoscopic computational algorithm for nanoscale motion analysis
Author(s): **Kanchan Saxena,** Amity Univ. (India); **Sunil Bhatt**, **Anuj Saxena, Dalip Singh Mehta,** Indian Institute of Technology Delhi (India)

13465-61 • 5:30 PM - 7:00 PM
Real-time parking lot monitoring for smart cities: a CNN-based approach using YOLO and RTSP-compatible cameras
Author(s): **Emmanuel Kurinaah**, **Nicolas Viera**, **Mekhi Hall**, **Keshawn Smith**, **Ying Yu, Xin Shen,** Univ. of Hartford (United States)

Wednesday 16 April 2025

SESSION 8: 3D IMAGE SENSING SYSTEMS II

16 April 2025 • 8:30 AM - 10:00 AM | Sanibel 1, Ballroom Level
Session Chair(s): **Kenji Yamamoto**, National Institute of Information and Communications Technology (Japan)

13465-23 • 8:30 AM - 9:00 AM
Efficient deep learning for snapshot compressive imaging *(Invited Paper)*
Author(s): **Xin Yuan, Miao Cao,** Westlake Univ. (China)

13465-24 • 9:00 AM - 9:30 AM
Structured illumination in quantitative super-resolution phase imaging *(Invited Paper)*
Author(s): **Sofia Obando-Vasquez,** Univ. of Massachusetts Dartmouth (United States); **Rene Restrepo**, **Raul Castaneda,** Univ. EAFIT (Colombia); **Ana Doblas,** Univ. of Massachusetts Dartmouth (United States); **Carlos A. Trujillo,** Univ. EAFIT (Colombia)

13465-25 • 9:30 AM - 10:00 AM
Single-shot imaging through scatter or turbulence using synthetic waves *(Invited Paper)*
Author(s): **Patrick Cornwall**, **Muralidhar Madabhushi Balaji**, **Pengyu Liu**, **Enrique Pena**, **John Bass,** Wyant College of Optical Sciences (United States); **Manuel Ballester,** Northwestern Univ. (United States); **Florian Willomitzer,** Wyant College of Optical Sciences (United States)

Coffee Break 10:00 AM - 10:30 AM

SESSION 9: 3D IMAGE SENSING SYSTEMS III

16 April 2025 • 10:30 AM - 11:45 AM | Sanibel 1, Ballroom Level
Session Chair(s): **Jae-Hyeung Park**, Seoul National Univ. (Korea, Republic of)

13465-30 • 10:30 AM - 10:45 AM
LFI: To be determined
Author(s): **Steven Lacava,** Ansys Government Initiatives, Inc. (United States)

13465-27 • 10:45 AM - 11:00 AM
Visualizing data using immersive virtual reality for improved analysis
Author(s): **John H. Kalivas**, **Jordan Peper, Hyrum Redd,** Idaho State Univ. (United States)

13465-28 • 11:00 AM - 11:15 AM
Saliency-based Learning for 3D Gaussian Splatting
Author(s): **Jiong Huang**, **Michelle Rybak**, **Thomas Sugg**, **Kyle O'Brien**, **Michelle Jou, Marc Bosch,** Accenture Federal Services (United States)

13465-29 • 11:15 AM - 11:30 AM
Confidence-driven planar element restoration for 3D volumetric data
Author(s): **Alex Fafard,** Two Six Technologies, Inc. (United States)

13465-26 • 11:30 AM - 11:45 AM
Trace detection of cotinine using gold nanoparticles coated Au mirror as sensitive and cost effective SERS probe
Author(s): **Vimarsh Awasthi**, **Sibashish Chakraborty, Satish Kumar Dubey,** Indian Institute of Technology Delhi (India)

CONFERENCE 13466

Advanced Optics for Imaging Applications: UV through LWIR X

14 April 2025 | Naples 1, Ballroom Level

Conference Chair(s): **Jay N. Vizgaitis,** optX Imaging Systems (United States); **Peter L. Marasco,** Air Force Research Lab. (United States); **Jasbinder S. Sanghera,** U.S. Naval Research Lab. (United States)

Program Committee: **Kyle R. Bryant,** U.S. Army Combat Capabilities Development Command (United States); **John P. Deegan,** Rochester Precision Optics, LLC (United States); **James B. Johnson,** MIT Lincoln Lab. (United States); **Spencer Novak,** LightPath Technologies, Inc. (United States); **S. Craig Olson,** L3Harris Technologies, Inc. (United States); **Clara Rivero-Baleine,** Lockheed Martin Missiles and Fire Control (United States); **Miguel P. Snyder,** DEVCOM C5ISR (United States); **Alan Symmons,** Vital Materials Co., Ltd. (United States); **Nicholas A. Thompson,** Thales Optronics Ltd. (United Kingdom)

Monday 14 April 2025

SESSION 1: MATERIALS AND FABRICATION

14 April 2025 • 8:50 AM - 10:30 AM | Naples 1, Ballroom Level
Session Chair(s): **Jay N. Vizgaitis**, optX Imaging Systems (United States); **Peter L. Marasco**, Air Force Research Lab. (United States)
8:50 AM: Welcome and opening remarks

13466-1 • 9:00 AM - 9:30 AM
Feedstocks for chalcogenide glass optics *(Invited Paper)*
Author(s): **Alan Symmons,** Vital Materials Co. Ltd. (United States); **Guillaume Gelinas,** Vital Materials Co., Ltd. (United States)

13466-3 • 9:30 AM - 9:50 AM
Processing and properties of recycled Germanium based Chalcogenide glass as a route to improved reclamation and reuse in advanced technologies
Author(s): **Casey M. Schwarz,** Ursinus College (United States); **Rashi Sharma**, **Mark Martino**, **Andrew Howe,** Univ. of Central Florida (United States); **Jake Klucinec,** Ursinus College (United States); **Kathleen A. Richardson,** Univ. of Central Florida (United States)

13466-4 • 9:50 AM - 10:10 AM
Silicon carbide mirror fabrication at Optimax
Author(s): **Thomas Olson, Felix Radesi,** Optimax Systems, Inc. (United States)

13466-6 • 10:10 AM - 10:30 AM
Broadband infrared coatings for defense and commercial applications
Author(s): **Robert Moore**, **Hilario Torres Aponte**, **Michael Gentile**, **Chris VanDerhoff**, **Amanda Foley**, **Michael Albrecht, Sandeep Kohli,** Zygo Corporation (United States)

Coffee Break 10:30 AM - 11:00 AM

SESSION 2: METAMATERIALS/METASURFACES I

14 April 2025 • 11:00 AM - 12:00 PM | Naples 1, Ballroom Level
Session Chair(s): **Peter L. Marasco**, Air Force Research Lab. (United States); **Jay N. Vizgaitis**, optX Imaging Systems (United States)

13466-8 • 11:00 AM - 11:20 AM
Direct design a hybrid MWIR achromatic doublet based on Sweatt model
Author(s): **Weiyu Chen, C. Kyle Renshaw,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

13466-9 • 11:20 AM - 11:40 AM
Enhanced phase control in metalenses using overlapping nanohole designs
Author(s): **Nicholas Grasso**, **Sadi M. Jawad Ahsan**, **Rachit Sood,** Univ. of Maryland, Baltimore County (United States); **David Barth,** Krishna P. Singh Ctr. for Nanotechnology (United States); **John V. Hryniewicz,** Thorlabs Quantum Electronics (United States); **Sang-Yeon Cho**, **Weimin Zhou,** DEVCOM Army Research Lab. (United States); **Fow-Sen Choa,** Univ. of Maryland, Baltimore County (United States)

13466-10 • 11:40 AM - 12:00 PM
Gaussian decomposition physical modeling applied to metasurface-refractive hybrid systems
Author(s): **Ko-Han Shih, C. Kyle Renshaw,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

Lunch Break 12:00 PM - 1:10 PM

SESSION 3: METAMATERIALS/METASURFACES II

14 April 2025 • 1:10 PM - 2:50 PM | Naples 1, Ballroom Level
Session Chair(s): **Jay N. Vizgaitis**, optX Imaging Systems (United States); **Peter L. Marasco**, Air Force Research Lab. (United States)

13466-11 • 1:10 PM - 1:30 PM
Deep Inverse Modeling the Near Field Response of Optical Metasurfaces
Author(s): **Saad Lahrichi**, **Marshall B. Lindsay**, **Scott D. Kovaleski**, **Derek T. Anderson**, **Jordan Malof,** Univ. of Missouri (United States); **Stanton R. Price, Steven R. Price,** U.S. Army Engineer Research and Development Ctr. (United States)

13466-13 • 1:30 PM - 1:50 PM
Key considerations for robust near-field response prediction and optical metasurface inverse design
Author(s): **Ethan J. Mick**, **Marshall B. Lindsay**, **Scott D. Kovaleski**, **Derek T. Anderson**, **Saad Lahrichi**, **Jordan Malof,** Univ. of Missouri (United States); **Stanton R. Price, Steven R. Price,** U.S. Army Engineer Research and Development Ctr. (United States)

13466-14 • 1:50 PM - 2:10 PM
Wavefront sensing in deep turbulence using metasurface optics and machine learning
Author(s): **Zachary J. Coppens**, **Arturo Martin Jimenez**, **Marc Baltes**, **Jackson Cornelius,** CFD Research Corp. (United States); **Neset Akozbek,** U.S. Army Space and Missile Defense Command (United States)

13466-15 • 2:10 PM - 2:30 PM
Towards autonomous material design of metamaterials via two-photon polymerization printing
Author(s): **Simon Fernandez**, **Matthew R. Maschmann**, **Marshall B. Lindsay**, **Scott D. Kovaleski**, **Ethan J. Mick**, **Derek T. Anderson,** Univ. of Missouri (United States); **Stanton R. Price**, **Steven R. Price,** U.S. Army Engineer Research and Development Ctr. (United States); **Aquila P. Galusha, James M. Keller,** Univ. of Missouri (United States)

13466-16 • 2:30 PM - 2:50 PM
Beyond silicon: meta-optics solutions for LWIR
Author(s): **Yakov Soskind,** Coherent Photonics LLC (United States); **Jesse Frantz, Jasbinder S. Sanghera,** U.S. Naval Research Lab. (United States)

Coffee Break 2:50 PM - 3:20 PM

SESSION 4: ADVANCED OPTICS FOR SYSTEMS

14 April 2025 • 3:20 PM - 5:20 PM | Naples 1, Ballroom Level
Session Chair(s): **Peter L. Marasco**, Air Force Research Lab. (United States); **Jay N. Vizgaitis**, optX Imaging Systems (United States)

13466-17 • 3:20 PM - 3:40 PM
Next-generation Anderson localization waveguides for high-resolution imaging
Author(s): **Andrea Ravagli,** SCHOTT North America, Inc. (United States)

13466-18 • 3:40 PM - 4:00 PM
Advancing freeform gradient index (GRIN) optics for vision correction
Author(s): **George M. Williams**, **Maxim Lunin**, **Paul Harmon, Hooman Akhavan,** NanoVox, LLC (United States)

13466-19 • 4:00 PM - 4:20 PM
Spherical aberration considerations in a paraxial optical cross section (OCS) calculation
Author(s): **Kevin J. McIntyre,** Leonardo DRS (United States)

13466-20 • 4:20 PM - 4:40 PM
Wideband dispersion control achieved with multi-material gradient index optics
Author(s): **George M. Williams**, **Maxim Lunin, Paul Harmon,** NanoVox, LLC (United States)

13466-21 • 4:40 PM - 5:00 PM
A multi-spectral compact local geometric distortion measurement setup based on a two-axis rotation of a camera
Author(s): **Leo Greusard**, **Valentin Brinster**, **Ikram Salihi**, **Adrien Bertaud, Catherine Barrat,** HGH Systèmes Infrarouges (France)

13466-22 • 5:00 PM - 5:20 PM
The total standard uncertainty of prism coupling refractometry in the midwave and longwave infrared
Author(s): **Andrew W. Howe**, **Mark Martino**, **Romain Gaume, Kathleen A. Richardson,** Univ. of Central Florida (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

CONFERENCE 13467

Optical Waveguide and Laser Sensors IV

15 - 16 April 2025 | Osceola 6, Ballroom Level

Conference Chair(s): **Robert A. Lieberman,** Lumoptix, LLC (United States); **Glen A. Sanders,** Honeywell Technology (United States); **Michael P. Buric,** National Energy Technology Lab. (United States)

Program Committee: **Jie Huang,** Missouri Univ. of Science and Technology (United States); **Nageswara Lalam,** National Energy Technology Lab. (United States); **Gary Pickrell,** Virginia Polytechnic Institute and State Univ. (United States); **Eric Udd,** Columbia Gorge Research LLC (United States); **Ruishu F. Wright, Jeffrey K. Wuenschell,** National Energy Technology Lab. (United States)

Monday 14 April 2025

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

SESSION 1: FIBER OPTIC INTERROGATOR TECHNOLOGIES AND DISTRIBUTED SENSING

15 April 2025 • 2:10 PM - 4:30 PM | Osceola 6, Ballroom Level
Session Chair(s): **Robert A. Lieberman**, Lumoptix, LLC (United States)

13467-1 • 2:10 PM - 2:30 PM
Efficient signal processing in BOTDA: Utilizing PCA and PCA-based neural networks for temperature monitoring
Author(s): **Hari Datta Bhatta**, **Nageswara R. Lalam**, **Sandeep R. Bukka, Ruishu F. Wright,** National Energy Technology Lab. (United States)

13467-2 • 2:30 PM - 2:50 PM
Numerical investigation of distributed fiber optic sensor installations for flexural guided wave-based NDE
Author(s): **Enrico Sarcinelli**, **Pengdi Zhang**, **Khurram Naeem,** Univ. of Pittsburgh (United States); **Ruishu F. Wright**, **Nageswara R. Lalam,** National Energy Technology Lab. (United States); **Paul R. Ohodnicki,** Univ. of Pittsburgh (United States)

Coffee Break • 2:50 PM - 3:20 PM

13467-6 • 3:20 PM - 3:40 PM
Microwave-photonics-enabled high-sensitivity demodulation of optical fiber Fabry-Perot interferometer sensors
Author(s): **Chen Zhu**, **Ruimin Jie, Jie Huang,** Missouri Univ. of Science and Technology (United States)

13467-7 • 3:40 PM - 4:00 PM
Dynamic infrared photon detection in gate-controlled graphene gratings
Author(s): **Richard M. Osgood**, **Michael Leuenberger,** U.S. Army Combat Capabilities Development Command Soldier Ctr. (United States); **Leila Deravi,** Northeastern Univ. (United States); **Ihsan Uluturk, Jin Ho Kim,** U.S. Army Combat Capabilities Development Command Soldier Ctr. (United States)

13467-8 • 4:00 PM - 4:30 PM
Enhancing the value of low-cost optical fiber gas sensors via machine learning *(Invited Paper)*
Author(s): **Jeffrey K. Wuenschell**, **John Dinh,** National Energy Technology Lab. (United States); **Sandeep R. Bukka,** National Energy Technology Lab. (United States), Leidos (United States); **Yang-Duan Su**, **Enrico Sarcinelli**, **Paul R. Ohodnicki,** Univ. of Pittsburgh (United States); **Ruishu F. Wright,** National Energy Technology Lab. (United States)

Wednesday 16 April 2025

SESSION 2: FIBER OPTIC SENSORS FOR INFRASTRUCTURE MONITORING I

16 April 2025 • 9:00 AM - 10:20 AM | Osceola 6, Ballroom Level
Session Chair(s): **Ruishu Feng Wright**, National Energy Technology Lab. (United States)

13467-9 • 9:00 AM - 9:20 AM
Pilot-scale validation of distributed optical fiber sensors for underground pipeline monitoring
Author(s): **Nageswara R. Lalam**, **Matthew M. Brister**, **Hari Datta Bhatta**, **Sandeep R. Bukka,** National Energy Technology Lab. (United States); **Samuel Baxter,** Colonial Pipeline Co. (United States); **Ruishu F. Wright,** National Energy Technology Lab. (United States)

13467-10 • 9:20 AM - 9:40 AM
AI-driven damage identification in pipelines using acoustic fiber sensors and guided waves with domain adaptation
Author(s): **Pengdi Zhang**, **Sandeep R. Bukka**, **Abhishek Venketeswaran**, **Ruishu F. Wright**, **Nageswara R. Lalam**, **Enrico Sarcinelli**, **Khurram Naeem, Paul R. Ohodnicki,** Univ. of Pittsburgh (United States)

13467-11 • 9:40 AM - 10:00 AM
Integrated framework for real-time gas pipeline monitoring: fusion of reduced-order simulations, experiments, and deep learning
Author(s): **Sandeep R. Bukka**, **Nageswara R. Lalam,** National Energy Technology Lab. (United States); **Pengdi Zhang,** Univ. of Pittsburgh (United States); **Ruishu F. Wright,** National Energy Technology Lab. (United States); **Paul R. Ohodnicki,** Univ. of Pittsburgh (United States)

13467-27 • 10:00 AM - 10:20 AM
A micro-structured optical fiber negative hydraulic pressure sensor
Author(s): **Ruimin Jie**, **Robert Abbott**, **Chen Zhu**, **Xiong Zhang, Jie Huang,** Missouri Univ. of Science and Technology (United States)

Coffee Break 10:20 AM - 10:50 AM

SESSION 3: FIBER OPTIC SENSORS FOR INFRASTRUCTURE MONITORING II

16 April 2025 • 10:50 AM - 12:00 PM | Osceola 6, Ballroom Level
Session Chair(s): **Jeffrey K. Wuenschell**, National Energy Technology Lab. (United States); **Ruishu Feng Wright**, National Energy Technology Lab. (United States)

13467-13 • 10:50 AM - 11:10 AM
Field tests of a multichannel fiber optic ultrasonic acoustic sensors for nuclear canister health monitoring
Author(s): **Khurram Naeem**, **Enrico Sarcinelli,** Univ. of Pittsburgh (United States); **Kayte Denslow,** Pacific Northwest National Lab. (United States); **Pengdi Zhang, Paul R. Ohodnicki,** Univ. of Pittsburgh (United States)

13467-14 • 11:10 AM - 11:30 AM
Improving stability of an optical fiber pH sensor with a calcined polyethylenimine-coating at high pressures and temperatures
Author(s): **Alexander J. Shumski**, **Daejin Kim**, **Scott Crawford, Ruishu F. Wright,** National Energy Technology Lab. (United States)

13467-15 • 11:30 AM - 12:00 PM
High-sensitivity measurement of ultrasonic waves with FBG sensors *(Invited Paper)*
Author(s): **Kara J. Peters**, **Waliur Rahman, Nate Parillo,** North Carolina State Univ. (United States)

Lunch/Exhibition Break 12:00 PM - 1:30 PM

SESSION 4: HARSH ENVIRONMENT SENSORS AND SENSORS IN ENERGY APPLICATIONS

16 April 2025 • 1:30 PM - 2:50 PM | Osceola 6, Ballroom Level
Session Chair(s): **Michael P. Buric**, National Energy Technology Lab. (United States)

13467-16 • 1:30 PM - 1:50 PM
Multimode Interferometric Optical Fiber Sensors with Polymer-Magnetic Nanoparticle Coatings for Magnetic Field Sensing
Author(s): **Jun Young Hong,** Univ. of Pittsburgh (United States); **Dolendra Karki,** National Energy Technology Lab. (United States); **Tulika Khanikar, Paul R. Ohodnicki,** Univ. of Pittsburgh (United States)

13467-18 • 1:50 PM - 2:10 PM
Low-cost multi-channel fiber optic interrogator for electric power grid applications
Author(s): **Heather Phillips**, **Yang-Duan Su**, **Jacob Jones**, **Jeffrey K. Wuenschell**, **Brandon Grainger, Paul R. Ohodnicki,** Univ. of Pittsburgh (United States)

13467-19 • 2:10 PM - 2:30 PM
Real-time hydrogen gas blend composition measurement with waveguide-enhanced Raman gas analyzer
Author(s): **Juddha Thapa**, **Michael P. Buric, Benjamin T. Chorpening,** National Energy Technology Lab. (United States)

13467-20 • 2:30 PM - 2:50 PM
Resonant photoacoustic sensors enhanced by differential measurement and multi-pass gas cells for trace methane detection
Author(s): **Guangyin Zhang,** Univ. of Pittsburgh (United States); **Nageswara R Lalam,** National Energy Technology Laboratory (United States); **Qirui Wang**, **Shuda Zhong**, **Guangqun Ma,** Univ. of Pittsburgh (United States); **Ruishu Wright**, **Jeffrey Wuenschell,** National Energy Technology Laboratory (United States); **Kevin P. Chen,** Univ. of Pittsburgh (United States)

Coffee Break 2:50 PM - 3:20 PM

SESSION 5: NOVEL WAVEGUIDES FOR SENSING

16 April 2025 • 3:20 PM - 5:10 PM | Osceola 6, Ballroom Level
Session Chair(s): **Glen A. Sanders**, Honeywell Technology (United States); **Nageswara R. Lalam**, National Energy Technology Lab. (United States)

13467-21 • 3:20 PM - 3:40 PM
Development of methacrylate-based polymer waveguides as an optical sensing element
Author(s): **Kunal Sharma,** The Univ. of Arizona (United States); **Waleed S. Mohammed,** Bangkok Univ. (Thailand); **Tanujjal Bora,** Asian Institute of Technology (Thailand)

13467-23 • 3:40 PM - 4:00 PM
Segregation of chromium and titanium in sapphire optical fiber grown via the laser-heated pedestal growth technique
Author(s): **Gary R. Lander**, **Dolendra Karki**, **Jeffrey K. Wuenschell,** National Energy Technology Lab. (United States); **Jun Young Hong**, **Paul R. Ohodnicki,** Univ. of Pittsburgh (United States); **Michael P. Buric,** National Energy Technology Lab. (United States)

13467-24 • 4:00 PM - 4:20 PM
Anti-resonant hollow-core fiber design and optimization with particle swarm optimization algorithm
Author(s): **Md Abu Sufian**, **Ameen Alhalemi**, **Jose Enrique Antonio-Lopez**, **Rodrigo Amezcua Correa, Axel Schülzgen,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

13467-25 • 4:20 PM - 4:40 PM
Broadband infrared photosensitive materials for sensor applications
Author(s): **Dmitry S. Starodubov,** DSTAR Communications Inc. (United States); **Narasimha Prasad,** NASA Langley Research Center (United States)

13467-26 • 4:40 PM - 5:10 PM
Comparison of SM optical fibers for distributed acoustic sensing *(Invited Paper)*
Author(s): **Xiaoguang Sun, Jie Li,** OFS (United States)

ON-DEMAND POSTERS

The posters listed below are available exclusively for online viewing during the week of SPIE Defense + Commercial Sensing 2025.

13467-3
Design and modeling of a fiber-optic multimodal sensing system for simultaneous measurement of multiple parameters
Author(s): **Naibing Ma,** RC Integrated Systems LLC (United States); **Rita Ma,** California Academy of Math and Science (United States)

13467-4
Fabrication and testing of a fiber-optic multimodal sensing system for simultaneous measurement of multiple parameters
Author(s): **Naibing Ma,** RC Integrated Systems LLC (United States); **Rita Ma,** California Academy of Math and Science (United States), RC Integrated Systems LLC (United States)

CONFERENCE 13468

Infrared Imaging Systems: Design, Analysis, Modeling, and Testing XXXVI

15 - 17 April 2025 | Osceola Ballroom A, Ballroom Level

Conference Chair(s): **David P. Haefner,** DEVCOM C5ISR (United States); **Gerald C. Holst,** JCD Publishing (United States)

Program Committee: **Gisele Bennett,** MEPSS LLC (United States); **Piet Bijl,** TNO (Netherlands); **Katrin Braesicke,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); **James A. Dawson,** Blake Labs, LLC (United States); **John W. Devitt,** RTX Corp. (United States); **Ronald G. Driggers,** Wyant College of Optical Sciences (United States); **Christopher N. Durell,** Labsphere, Inc. (United States); **Richard L. Espinola,** U.S. Naval Research Lab. (United States); **Orges Furxhi,** True Colors Infrared Imaging (United States); **Jonathan G. Hixson,** DEVCOM C5ISR (United States); **Eddie L. Jacobs,** The Univ. of Memphis (United States); **Daniel A. LeMaster,** U.S. Dept. of Transportation (United States); **Terrence S. Lomheim,** The Aerospace Corp. (United States); **C. Kyle Renshaw,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States); **Joseph P. Reynolds,** DEVCOM C5ISR (United States); **Austin A. Richards,** Oculus Photonics LLP (United States); **Michael A. Soel,** Teledyne FLIR LLC (United States)

Monday 14 April 2025

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

WELCOME AND OPENING REMARKS

15 April 2025 • 1:50 PM - 2:00 PM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **David P. Haefner**, DEVCOM C5ISR (United States); **Gerald C. Holst**, JCD Publishing (United States)
Join the conference chairs for a welcome and opening remarks.

SESSION 1: MODELING I

15 April 2025 • 2:00 PM - 3:20 PM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **Michael A. Soel**, Teledyne FLIR LLC (United States)

13468-2 • 2:00 PM - 2:20 PM
Thermal imaging in the eSWIR band
Author(s): **Angus J. Hendrick**, **Patrick Leslie,** The Univ. of Arizona (United States); **Silviu Velicu,** EPIR, Inc. (United States); **Richard Pimpinella**, **Jeff Voss,** Episensors, Inc. (United States); **Ronald G. Driggers,** The Univ. of Arizona (United States)

13468-3 • 2:20 PM - 2:40 PM
Simple visualization technique for multi-dimensional frequency domain noise components
Author(s): **Steven J. Marteney,** Leonardo DRS (United States)

13468-4 • 2:40 PM - 3:00 PM
Assessing UAV flight dynamics using platform-mounted sensor MTFs
Author(s): **Jordan L. Rubis**, **Jonathon Wade**, **Patrick Leslie,** Wyant College of Optical Sciences (United States); **Eddie L. Jacobs,** The Univ. of Memphis (United States); **Joseph K. Conroy,** DEVCOM Army Research Lab. (United States); **Ronald G. Driggers,** Wyant College of Optical Sciences (United States)

13468-5 • 3:00 PM - 3:20 PM
Drone based near-infrared imaging system for remote search of targets in difficult terrain
Author(s): **Li Zhang,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States); **Thomas P. Watson,** The Univ. of Memphis (United States); **Changkee Hong, C. Kyle Renshaw,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

Coffee Break 3:20 PM - 3:50 PM

SESSION 2: MODELING II

15 April 2025 • 3:50 PM - 5:20 PM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **Christopher N. Durell**, Labsphere, Inc. (United States)

13468-6 • 3:50 PM - 4:20 PM
Performance characterization of infrared imagers for horizon matching-based geolocalization methods *(Invited Paper)*
Author(s): **Jeremy W. Mares, C. Kyle Renshaw,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

13468-7 • 4:20 PM - 4:40 PM
Scene contrast temperature in different climates
Author(s): **Alfred Moore**, **Jonathan Wade**, **Jordan L. Rubis**, **Ronald G. Driggers,** The Univ. of Arizona (United States); **Eddie L. Jacobs,** The Univ. of Memphis (United States)

13468-9 • 4:40 PM - 5:00 PM
Resolution and sensitivity of superband sensors
Author(s): **Luke D. Somerville**, **Patrick Leslie,** The Univ. of Arizona (United States); **Jon Paul Curzan,** Cyan Systems, Inc. (United States); **Frank Jaworski,** Cyan Systems (United States); **John Caulfield,** Cyan Systems, Inc. (United States); **Ronald G. Driggers,** The Univ. of Arizona (United States)

13468-10 • 5:00 PM - 5:20 PM
Measuring and modeling of wetted surfaces (2.0)
Author(s): **David A. Vaitekunas,** W. R. Davis Engineering, Ltd. (Canada); **Moses Kodur, Martin Szczesniak,** Surface Optics Corp. (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13468-39 • 5:30 PM - 7:00 PM
Spectral analysis of low temperature thermal emitters for spectrally accurate IR scene projection: an update
Author(s): **Marten Wiehn**, **Miriam Wolmeringer, Michael Henrichsen,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

13468-40 • 5:30 PM - 7:00 PM
Field-of-view change with respect to ionization of solution
Author(s): **Doğan Uğur Sakarya,** Roketsan A.S. (Turkey)

Wednesday 16 April 2025

SESSION 3: MODELING III

16 April 2025 • 9:00 AM - 10:20 AM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **Eddie L. Jacobs**, The Univ. of Memphis (United States)

13468-11 • 9:00 AM - 9:20 AM
Estimating rotorcraft motion MTFs using inertial measurements
Author(s): **Jonathan Wade**, **Patrick Leslie,** The Univ. of Arizona (United States); **Jordan L. Rubis,** Wyant College of Optical Sciences (United States); **Orges Furxhi,** True Colors Infrared Imaging (United States); **Ronald G. Driggers,** the Univ. of Arizona (United States)

13468-12 • 9:20 AM - 9:40 AM
The impact of fixed pattern noise on moving imagery as measured by MRT and DMRT
Author(s): **Orges Furxhi,** True Colors Infrared Imaging (United States); **Jordan L. Rubis**, **Chance Lawrence,** The Univ. of Arizona (United States); **Gerald C. Holst,** JCD Publishing (United States); **Ronald G. Driggers,** The Univ. of Arizona (United States)

13468-13 • 9:40 AM - 10:00 AM
Fixed pattern noise impact on pilotage sensor performance
Author(s): **Chance Lawrence**, **Jordan L. Rubis**, **Orges Furxhi,** The Univ. of Arizona (United States); **Gerald C. Holst,** JCD Publishing (United States); **Ronald G. Driggers,** The Univ. of Arizona (United States)

13468-15 • 10:00 AM - 10:20 AM
Phenomenology in MWIR targeting
Author(s): **Patrick Leslie**, **Ronald G. Driggers,** The Univ. of Arizona (United States); **Eddie L. Jacobs, Orges Furxhi,** The Univ. of Memphis (United States)

Coffee Break 10:20 AM - 10:50 AM

SESSION 4: MODELING IV

16 April 2025 • 10:50 AM - 11:50 AM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **Katrin Braesicke**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

13468-37 • 10:50 AM - 11:10 AM
Measuring the point spread function and fill factor of thermal cameras using a scanned line source and tomographic reconstruction
Author(s): **Torbjørn Skauli, Gard Momrak Selnesaunet,** Univ. of Oslo (Norway)

13468-18 • 11:10 AM - 11:30 AM
Thermal imager performance assessment: MTDP prediction from camera images
Author(s): **Daniel Wegner**, **José Pérez, Stefan Keßler,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

13468-19 • 11:30 AM - 11:50 AM
Further development of the target acquisition performance model ECOMOS: ECOMOS-2 model capabilities and release plan
Author(s): **Stefan Keßler,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); **Piet Bijl,** TNO (Netherlands); **Jean-Paul Foing,** Delegation Generale Pour L'Armament (France); **Leander van den Heuvel**, **Johan-Martijn ten Hove,** TNO (Netherlands); **Luc Labarre,** ONERA (France); **José Pérez,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); **Laurent Pigois,** Delegation Generale Pour L'Armament (France); **Daniel Wegner,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

Lunch/Exhibition Break 11:50 AM - 1:20 PM

SESSION 5: EVENT CAMERAS

16 April 2025 • 1:20 PM - 3:30 PM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **C. Kyle Renshaw**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

13468-20 • 1:20 PM - 1:50 PM
Raytheon event-based camera technology *(Invited Paper)*
Author(s): **John W. Devitt,** RTX Corp. (United States)

13468-21 • 1:50 PM - 2:10 PM
Characterizing the Ambiguity of Event-based Pixel Temporal Contrast Encoding
Author(s): **Jonah P. Sengupta,** DEVCOM Army Research Lab. (United States); **Stephen D. Burks, David P. Haefner,** DEVCOM C5ISR (United States)

13468-22 • 2:10 PM - 2:30 PM
Experimental methods for predicting the signal-to-noise ratio for an event-based camera
Author(s): **Stephen D. Burks,** DEVCOM C5ISR (United States)

13468-23 • 2:30 PM - 2:50 PM
Noise analysis for event-based infrared ROICs
Author(s): **Andreas G. Andreou, Pablo Linares-Serrano,** Johns Hopkins Univ. (United States)

13468-24 • 2:50 PM - 3:10 PM
Interpreting the step response of neuromorphic sensors for small and large signal characterization
Author(s): **Danyal Ahsanullah,** Mustang Optics, LLC (United States), Southern Methodist Univ. (United States); **Ross Elliott, Prasanna Rangarajan,** Southern Methodist Univ. (United States)

13468-25 • 3:10 PM - 3:30 PM
Resolution measurement techniques for event-based sensors using dynamic virtual targets
Author(s): **David J. Radulski-Bloom,** Wyant College of Optical Sciences (United States), Naval Surface Warfare Ctr., Crane Div. (United States); **Ronald G. Driggers,** Wyant College of Optical Sciences (United States); **David P. Haefner**, **Stephen D. Burks,** DEVCOM C5ISR (United States); **Joshua Teague,** Wyant College of Optical Sciences (United States)

Coffee Break 3:30 PM - 4:00 PM

SESSION 6: ACTIVE IMAGING

16 April 2025 • 4:00 PM - 5:40 PM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **Ronald G. Driggers**, Wyant College of Optical Sciences (United States)

13468-26 • 4:00 PM - 4:20 PM
Performance Characterization of Electronic FMCW Active Imagers
Author(s): **Joshua Teague,** The Univ. of Arizona (United States)

13468-27 • 4:20 PM - 4:40 PM
Experimental comparison of active imaging modes for long-range target imaging in multiple reflective bands
Author(s): **Eunmo Kang**, **Oles Fylypiv**, **Jeremy W. Mares**, **Clay Chester,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States); **Joshua Follansbee**, **Ronald G. Driggers,** The Univ. of Arizona (United States); **C. Kyle Renshaw,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

13468-28 • 4:40 PM - 5:00 PM
Performance comparison of LWIR and MWIR systems for drone-based targeting
Author(s): **Amy Hermann,** The Univ. of Arizona (United States)

13468-30 • 5:00 PM - 5:20 PM
Target track error due to speckle
Author(s): **Peter Dean-Erlander**, **Joshua Follansbee**, **Joshua Teague**, **Angus J. Hendrick**, **Eric W. Mitchell, Ronald G. Driggers,** The Univ. of Arizona (United States)

13468-29 • 5:20 PM - 5:40 PM
Coherent imaging performance: noise-equivalent angle validation
Author(s): **Eric W. Mitchell**, **Jason E. Kuszynski,** U.S. Army Space and Missile Defense Command (United States); **Mark F. Spencer,** Air Force Institute of Technology (United States); **Ronald G. Driggers,** The Univ. of Arizona (United States); **Wesley Barnes,** U.S. Army Space and Missile Defense Command (United States); **David P. Haefner,** DEVCOM C5ISR (United States)

Thursday 17 April 2025

SESSION 7: TESTING

17 April 2025 • 9:30 AM - 11:30 AM | Osceola Ballroom A, Ballroom Level
Session Chair(s): **John W. Devitt**, RTX Corp. (United States)

13468-35 • 9:30 AM - 10:00 AM
How to plan and execute an effective EOIR field data collection *(Invited Paper)*
Author(s): **Ronald G. Driggers**, **Orges Furxhi,** Wyant College of Optical Sciences (United States); **Gerald C. Holst,** JCD Publishing (United States); **David P. Haefner,** DEVCOM C5ISR (United States); **Jennifer Hewitt,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States); **Roger W. Thompson,** DEVCOM C5ISR (United States)

13468-32 • 10:00 AM - 10:20 AM
Automated Region of Interest (ROI) Selection for Camera Characterization
Author(s): **David P. Haefner,** DEVCOM C5ISR (United States)

13468-31 • 10:20 AM - 10:50 AM
HITL laser injection simulator and threat detector development *(Invited Paper)*
Author(s): **C. Kyle Renshaw**, **Franley Casado, Elisa Johnston,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

13468-34 • 10:50 AM - 11:10 AM
Laser waveform shaping for high dynamic range test applications
Author(s): **Danyal Ahsanullah,** Mustang Optics, LLC (United States), Southern Methodist Univ. (United States); **Surya Dinesh,** Mustang Optics, LLC (United States); **Prasanna Rangarajan,** Southern Methodist Univ. (United States)

13468-38 • 11:10 AM - 11:30 AM
A new methodology for reducing the NETD in LWIR imaging
Author(s): **Germano S. Fonseca**, **Adenir da Silva Filho**, **Thiago Bittencourt, Leonardo B. de Sá,** Ctr. Tecnologico do Exercito (Brazil)

CONFERENCE 13469

Infrared Technology and Applications LI

14 - 17 April 2025 | Osceola Ballroom B, Ballroom Level

Conference Chair(s): **Gabor F. Fulop,** Maxtech International, Inc. (United States), Infrared Imaging News (United States); **Michael H. MacDougal,** Attollo Engineering, LLC (United States); **David Z. Ting,** Jet Propulsion Lab. (United States)

Conference Co-Chair(s): **Masafumi Kimata,** Consultant (Japan)

Program Committee: **Tayfun Akin,** Mikro-Tasarim Elektronik San. ve Tic. A.S. (Turkey), Middle East Technical Univ. (Turkey); **Oguz Altun,** ASELSAN A.S. (Turkey); **Neil F. Baril,** U.S. Army CCDC C5ISR Ctr. Night Vision & Electronic Sensors Directorate (United States); **Eric Belhaire,** Thales (France); **Richard J. Blackwell,** BAE Systems (United States); **Wolfgang A. Cabanski,** AIM INFRAROT-MODULE GmbH (Germany); **John T. Caulfield,** Cyan Systems, Inc. (United States); **Leonard P. Chen,** Raytheon Technologies Corp. (United States); **Eric Costard,** IRnova AB (Sweden); **Michael T. Eismann,** Air Force Research Lab. (United States); **Martin H. Ettenberg,** Princeton Infrared Technologies, Inc. (United States); **Michael J. Evans,** Sensors Unlimited, a Collins Aerospace Co. (United States); **Adam Greenen,** Leonardo UK Ltd. (United Kingdom); **Michael Groenert,** U.S. Army CCDC C5ISR Ctr. Night Vision & Electronic Sensors Directorate (United States); **Sarath D. Gunapala,** Jet Propulsion Lab. (United States); **Charles M. Hanson,** Consultant (United States); **Arjun Kar-Roy,** Tower Semiconductor USA Inc. (United States); **Michael W. Kelly,** Anduril Industries, Inc. (United States); **Young-Ho Kim,** i3system, Inc. (Korea, Republic of); **Ethan J. D. Klem,** SWIR Vision Systems (United States); **Philip C. Klipstein,** SCD SemiConductor Devices (Israel); **Piotr Marcin Martyniuk,** Wojskowa Akademia Techniczna im. Jaroslawa Dabrowskiego (Poland); **Whitney Mason,** Defense Advanced Research Projects Agency (United States); **Mario O. Münzberg,** HENSOLDT Optronics GmbH (Germany); **Minh Nguyen,** HRL Labs., LLC (United States); **Shinpei Ogawa,** Mitsubishi Electric Corp. (Japan); **Tony J. Ragucci,** Leonardo DRS (United States); **Manijeh Razeghi,** Northwestern Univ. (United States); **Donald A. Reago,** U.S. Army CCDC C5ISR Ctr. Night Vision & Electronic Sensors Directorate (United States); **Charles J. Reyner,** Air Force Research Lab. (United States); **Antoni Rogalski,** Wojskowa Akademia Techniczna im. Jaroslawa Dabrowskiego (Poland); **Laurent Rubaldo,** Lynred (France); **Thomas R. Schimert,** DRS Network & Imaging Systems, LLC (United States); **Nansheng Tang,** L3Harris Technologies, Inc. (United States); **Christophe Vasse,** Thales LAS France SAS (France); **Alexander Veprik,** Cryo Tech Ltd. (Israel); **Mike D. Walters,** Teledyne FLIR LLC (United States)

Monday 14 April 2025

SESSION 1: SHORTWAVE INFRARED I

14 April 2025 • 9:00 AM - 10:10 AM | Osceola Ballroom B, Ballroom Level

Session Chair(s): **Michael J. Evans**, Sensors Unlimited, a Collins Aerospace Co. (United States); **Martin H. Ettenberg**, Princeton Infrared Technologies, Inc. (United States)

9:00 AM: Opening Remarks

13469-2 • 9:10 AM - 9:30 AM

Extended shortwave infrared technological developments at Lynred

Author(s): **Nicolas Péré-Laperne**, **Laurent Espuno**, **Jocelyn Berthoz**, **Magalie Mailard**, **Amandine Badina**, **Michel Vuillermet,** Lynred (France); **Victor Parahyba**, **François Coursaget,** New Imaging Technologies SA (France); **Adrien Khalili, Emmanuel Lhuillier,** Sorbonne Université, CNRS, Institut des NanoSciences de Paris (France)

13469-3 • 9:30 AM - 9:50 AM

Development and optimization of SWIR pixel based on selective Ge on Si growth, stacking sensor, and logic wafers

Author(s): **Tsofnat Safrani**, **Dmitry Veinger, Adi Birman,** Tower Semiconductor Ltd. (Israel)

13469-5 • 9:50 AM - 10:10 AM
Investigation of background doping and polarity in the unintentionally doped layer of PIN Ge0.91Sn0.09 photodiodes on Si substrate
Author(s): **Punam Murkute,** The Ohio State Univ. (United States); **Nathan McKee,** SK Infrared (United States); **Neha H. Nooman,** The Ohio State Univ. (United States); **Eikhyun Cho,** SK Infrared (United States); **TJ Ronningen**, **Chirs Chae**, **Jinwoo Hwang,** The Ohio State Univ. (United States); **Teressa S. Basko**, **Mike Garter,** SK Infrared (United States); **Sanjay Krishna,** The Ohio State Univ. (United States)

Coffee Break 10:10 AM - 10:40 AM

SESSION 2: SHORTWAVE INFRARED II

14 April 2025 • 10:40 AM - 12:00 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Martin H. Ettenberg**, Princeton Infrared Technologies, Inc. (United States); **Michael J. Evans**, Sensors Unlimited, a Collins Aerospace Co. (United States)

13469-6 • 10:40 AM - 11:00 AM
New SWIR product introduction from SUI
Author(s): **John C. Liobe**, **John Wieners**, **John Tagle**, **Brendan Murphy**, **Sean Houlihan**, **Michael J. Evans, Grant James,** Sensors Unlimited, a Collins Aerospace Co. (United States)

13469-7 • 11:00 AM - 11:20 AM
SWIR product lines using small pixel pitch high-resolution focal plane arrays and advanced functionalities
Author(s):

13469-10 • 11:20 AM - 11:40 AM
High-speed imaging at extended SWIR wavelengths using CQDs
Author(s): **Markus Nenonen**, **Janne Tamminen**, **Sami Kallioinen**, **Jarkko Routama,** Emberion Oy (Finland); **Surama Malik**, **David So**, **Chris Bower**, **Yinglin Liu**, **Samiul Haque,** Emberion Ltd. (United Kingdom); **Jyri Hämäläinen,** Emberion Oy (Finland); **Piers Andrew,** Emberion Ltd. (United Kingdom); **Mark Allen,** Emberion Oy (Finland)

13469-75 • 11:40 AM - 12:00 PM
Progress in the Development of Quantum Dots for SWIR Image Sensing Applications
Author(s): **Anish Priyadarshi**, **James Harris**, **Ombretta Masala**, **Nigel Pickett,** Nanoco Technologies Ltd. (United Kingdom); **Nathalie Gresty,** Nanoco Technologies Ltd (United Kingdom)

Lunch Break 12:00 PM - 1:50 PM

SESSION 3: AVALANCHE PHOTODIODES

14 April 2025 • 1:50 PM - 2:50 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Sanjay Krishna**, The Ohio State Univ. (United States)

13469-11 • 1:50 PM - 2:10 PM
Progress at Leonardo UK in HOT APD array technology development for high-speed 2D linear mode photon counting applications
Author(s): **Charlie Turner, Peter Thorne,** Leonardo UK Ltd. (United Kingdom)

13469-12 • 2:10 PM - 2:30 PM
InGaAs-based devices for laser spot tracking and long-range remote sensing
Author(s): **John C. Liobe**, **Michael J. Evans**, **Krishna Linga**, **Wei Huang**, **Paul Bereznycky**, **Scott Endicter**, **William Gustus**, **John Tagle, Sean Houlihan,** Sensors Unlimited, a Collins Aerospace Co. (United States)

13469-13 • 2:30 PM - 2:50 PM
Carrier transport using temperature dependent measurements in antimony-based avalanche photodiodes
Author(s): **Sophie Mills,** The Ohio State Univ. (United States); **Bhupesh Bhardwaj,** Indian Institute of Technology Bombay (India); **Seunghyun Lee**, **Hyemin Jung,** The Univ. of Texas at Arlington (United States); **TJ Ronningen,** The Ohio State Univ. (United States); **Dinesh Kabra,** Indian Institute of Technology Bombay (India); **Sanjay Krishna,** The Ohio State Univ. (United States)

Coffee Break 2:50 PM - 3:20 PM

SESSION 4: UNCOOLED

14 April 2025 • 3:20 PM - 5:20 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Masafumi Kimata**, Consultant (Japan); **Tony J. Ragucci**, DRS Network & Imaging Systems, LLC (United States)

13469-14 • 3:20 PM - 3:40 PM
Microbolometer detector optimized for missile seekers
Author(s): **Udi Mizrahi**, **Rinat Raichman**, **Leonid Rybak**, **Eran Avnon**, **Roni Hadar**, **Leonid Krasovitski**, **Niv Shiloah**, **Claudio Jakobson**, **Haim Mary**, **Edan Shunem**, **Igal Bar ilan,** SCD SemiConductor Devices (Israel); **Benny Milgrom, Or Dicker,** Israel Ministry of Defense (Israel)

13469-15 • 3:40 PM - 4:00 PM
How to reduce the memory effect in microbolometer cameras?
Author(s): **Jean-Claude Krapez,** ONERA (France)

13469-16 • 4:00 PM - 4:20 PM
Staring at the sun: advanced TCR materials for robust thermal imaging *(Invited Paper)*
Author(s): **Sean Andrews,** Obsidian Sensors, Inc. (United States)

13469-17 • 4:20 PM - 4:40 PM
Uncooled 2100×2048 focal plane array for NASA sustainable land imaging technology sensor
Author(s): **Thomas R. Schimert**, **Murali Chitteboyina**, **Brianna Western**, **David Hamann**, **Cecil Gerber**, **Lewis Wood**, **Delbert Cantu**, **Mike Sullivan**, **Q. Suen**, **Kuni Shimizu**, **Christopher Roath**, **Eric Williams**, **Carlos Trujillo**, **Christopher Reed**, **Tony Ragucci**, **Lou Kilmer**, **Christopher McNay**, **Phillip Ely,** Leonardo DRS (United States); **Sachidananda Babu,** NASA Earth Science Technology Office (United States)

13469-18 • 4:40 PM - 5:00 PM
Electrical characteristics of SixGeyO1-x-y thin films by combinatorial approach
Author(s): **Farhana Jesmin Tuli**, **Akshay Kumar Reddy Koppula**, **Sura Abd-Alzahra Muhsin,** Univ. of Missouri (United States); **Alexei O. Orlov**, **Edward C. Kinzel,** Univ. of Notre Dame (United States); **Mahmoud Almasri,** Univ. of Missouri (United States)

13469-19 • 5:00 PM - 5:20 PM
Si-based LWIR metalens for 80 × 60 pixel uncooled IRFPA
Author(s): **Misaki Hanaoka**, **Shoichiro Fukushima**, **Masaaki Shimatani, Shinpei Ogawa,** Mitsubishi Electric Corp. (Japan)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 10:45 AM

SESSION 5: III-V BULK AND TYPE-II SUPERLATTICE I

15 April 2025 • 10:45 AM - 11:55 AM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Linda Höglund**, IRnova AB (Sweden); **Binh-Minh Nguyen**, HRL Labs., LLC (United States)

13469-20 • 10:45 AM - 11:15 AM
Extended SWIR type-II superlattice detectors at IRnova *(Invited Paper)*
Author(s): **Linda Höglund**, **Marie Delmas**, **David Ramos**, **Thierry Kohl**, **Ruslan Ivanov**, **Laura Zurauskaite**, **David Rihtnesberg**, **Dilara G. Buldu**, **Linnea Bendrot**, **Dean Evans**, **Sergiy Smuk**, **Anton Smuk**, **Smilja Becanovic**, **Susanne Almqvist**, **Pia Tinghag, Eric Costard,** IRnova AB (Sweden)

13469-21 • 11:15 AM - 11:35 AM
HD detectors based on Type-II superlattices at ASELSAN
Author(s): **Neslihan Demirer**, **Goktug Agca**, **Omer Lutfi Nuzumlali**, **Esin Akca, Hakan Caliskan,** ASELSAN A.S. (Turkey)

13469-22 • 11:35 AM - 11:55 AM
Sparrow-HD HOT MWIR family for surveillance and MAWS applications
Author(s): **Avi Magid**, **Itay Hirsh**, **Nimrod Ben Ari**, **Michal Nitzani**, **Eran Armon**, **Sivan Gliksman**, **Sivan Srur Nawi**, **Eran Buki**, **Yossi Aghion**, **Nataniel Ashush**, **Izhak Talala**, **Josh Lazarus**, **Ilan Veshnevski**, **Irena Vladovsky,** SCD SemiConductor Devices (Israel); **Or Dicker**, **Benny Milgrom,** Israel Ministry of Defense (Israel); **Tuvy Markovitz,** SCD SemiConductor Devices (Israel)

Lunch/Exhibition Break 11:55 AM - 1:30 PM

SESSION 6: III-V BULK AND TYPE-II SUPERLATTICE II

15 April 2025 • 1:30 PM - 3:10 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Edward K. Huang**, Attollo Engineering, LLC (United States); **Oguz Altun**, ASELSAN A.S. (Turkey)

13469-23 • 1:30 PM - 2:00 PM
L3Harris advancements in large format Type II superlattice FPA technology *(Invited Paper)*
Author(s): **Robert A. Jones**, **Jon Blevins**, **Steven Allen**, **Daniel Chmielewski, Rudy Fink,** L3Harris Technologies, Inc. (United States)

13469-24 • 2:00 PM - 2:30 PM
Strained layer superlattice focal plane array maturation for computational imaging applications *(Invited Paper)*
Author(s): **Chaffra Affouda**, **Edward Smith**, **Bradley Eachus**, **Christopher David**, **Curtis Colonero**, **Justin Baker**, **Christian Boemler, Michael Kelly,** Anduril Industries, Inc. (United States)

13469-25 • 2:30 PM - 2:50 PM
T2SL and QWIP HD detectors at IRnova for MWIR, LWIR, and polarimetric imaging
Author(s): **Ruslan Ivanov**, **Thierry Kohl**, **Marie Delmas**, **Linda Höglund**, **David Ramos**, **Laura Zurauskaite**, **Dean Evans**, **David Rihtnesberg**, **Dilara G. Buldu**, **Linnea Bendrot**, **Anton Smuk**, **Dennis Visser**, **Sergiy Smuk**, **Sara Högnadottir**, **Smilja Becanovic**, **Susann Sehlin**, **Susanne Almqvist**, **Maria Englund**, **Pia Tinghag, Eric Costard,** IRnova AB (Sweden)

13469-26 • 2:50 PM - 3:10 PM
Recent advancements in high-definition HOT MWIR and eSWIR camera cores with 5μm pixel pitch
Author(s): **Edward K. Huang**, **Andrew D. Hood**, **Kai Yang**, **Riley Yakel**, **Dustin Hibberd**, **Vince Loung**, **Mitchell Oleson**, **Randall Lott**, **Jeremy Thomas, Michael MacDougal,** Attollo Engineering, LLC (United States)

Coffee Break 3:10 PM - 3:30 PM

SESSION 7: KEYNOTE SESSION

15 April 2025 • 3:30 PM - 4:10 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Michael H. MacDougal**, Attollo Engineering, LLC (United States)

13469-27 • 3:30 PM - 4:10 PM
Commons: DoD's microelectronics for the defense and commercial sensing ecosystem (Keynote Presentation)
Author(s): **Timothy Morgan,** Naval Surface Warfare Ctr. Crane Div. (United States)

SESSION 8: INFRARED IN ASIA

15 April 2025 • 4:10 PM - 5:30 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Masafumi Kimata**, Consultant (Japan)

13469-28 • 4:10 PM - 4:30 PM
High-detectivity bolometer type uncooled longwave infrared detector using semi-conducting SWCNT networks in VGA formats
Author(s): **Tomo Tanaka,** NEC Corp. (Japan), National Institute of Advanced Industrial Science and Technology (Japan); **Masahiko Sano,** NEC Corp. (Japan); **Masataka Noguchi**, **Takashi Miyazaki**, **Toshie Miyamoto,** NEC Corp. (Japan), National Institute of Advanced Industrial Science and Technology (Japan); **Megumi Kanaori,** National Institute of Advanced Industrial Science and Technology (Japan); **Ryota Yuge,** NEC Corp. (Japan), National Institute of Advanced Industrial Science and Technology (Japan)

13469-29 • 4:30 PM - 4:50 PM
640x512 T2SL dual-band infrared detector and read-out circuit
Author(s): **Young Tak Roh Byung-Hyuk Kim**, **Young Ho Kim, Han Jung,** i3system, Inc. (Korea, Republic of)

13469-30 • 4:50 PM - 5:10 PM
Comparative study of digital and random alloy T2SLs on InP substrates
Author(s): **Sundararajan Balasekaran**, **Makoto Murata**, **Takashi Kato, Yasuhiro Iguchi,** Sumitomo Electric Industries, Ltd. (Japan)

13469-31 • 5:10 PM - 5:30 PM
Graphene-InAs/GaInSb type-II superlattice-based infrared photodetectors
Author(s): **Shoichiro Fukushima**, **Masaaki Shimatani**, **Manabu Iwakawa, Shinpei Ogawa,** Mitsubishi Electric Corp. (Japan)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13469-69 • 5:30 PM - 7:00 PM
Basic study of wide dynamic range and anti-blooming InGaAs detector for outdoor use case by linear-logarithmic response ROIC and potential barriered pixel *(Invited Paper)*
Author(s): **Sakura Ishino,** Acquisition, Technology & Logistics Agency (ATLA) (Japan); **Mutsuo Ogura**, **Katsuhiko Nishida,** IR Spec Corp. (Japan); **Hiroshi Murofushi**, **Masahiko Sano**, **Yutaka Tanaka**, **Katsuya Kawano**, **Takashi Kitashima,** NEC Corp. (Japan); **Junichi Kudo**, **Yoichi Onishi,** Acquisition, Technology & Logistics Agency (ATLA) (Japan); **Michiya Kibe,** Acquisition, Technology & Logistics Agency (ATLA) (Japan) (Japan); **Masatoshi Koyama, Shingo Kobayashi,** Acquisition, Technology & Logistics Agency (ATLA) (Japan)

13469-70 • 5:30 PM - 7:00 PM
Graphene-metagrating hybrid nanostructures for advanced functional infrared sensors
Author(s): **Shinpei Ogawa**, **Manabu Iwakawa**, **Shoichiro Fukushima, Masaaki Shimatani,** Mitsubishi Electric Corp. (Japan)

13469-71 • 5:30 PM - 7:00 PM
Multi-foci all-dielectric metalens for long-wavelength infrared
Author(s): **Misaki Hanaoka**, **Shoichiro Fukushima**, **Masaaki Shimatani, Shinpei Ogawa,** Mitsubishi Electric Corp. (Japan)

13469-72 • 5:30 PM - 7:00 PM
Advanced software solutions for IR images
Author(s): **Benoit Louvat**, **Hermann Delestre**, **Mickael Pouchol**, **Cathy Combet, Julien Walther,** Lynred (France)

13469-73 • 5:30 PM - 7:00 PM
Adaptive decoy optimization in the long-wave
Author(s): **Alex Fafard**, **Ashley Antonides, Jennifer Csicsery-Ronay,** Two Six Technologies, Inc. (United States)

13469-74 • 5:30 PM - 7:00 PM
Improved high-speed infrared imaging for moving targets: New high dynamic range camera against standard super-framing process
Author(s): **Antoine Dumont**, **Joseph Carrock**, **Fabien A. Dupont**, **Frederick Marcotte**, **Ben Saute, Vince Morton,** Telops Inc. (Canada)

Wednesday 16 April 2025

SESSION 9: MCT/III-V FOCAL PLANE ARRAYS AND ROICS I

16 April 2025 • 8:00 AM - 9:40 AM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Sarath D. Gunapala**, Jet Propulsion Lab. (United States)

13469-32 • 8:00 AM - 8:20 AM
Extraction of traps parameters in MWIR HgCdTe using bias variation of a DI focal plane array
Author(s): **Olivier Gravrand**, **Hugo Rousset**, **Nicolas Baier**, **Titouan Le Goff**, **Jean-Alain Nicolas,** CEA-LETI (France); **Diane Sam-Giao,** Lynred (France)

13469-33 • 8:20 AM - 8:40 AM
Enabling access to low SWaP IR-modules for large format and long-wave FPAs
Author(s): **Holger Lutz**, **Rainer Breiter**, **Detlef Eich**, **Heinrich Figgemeier**, **Stefan Hanna, Daniel Prigge,** AIM Infrarot-Module GmbH (Germany)

13469-34 • 8:40 AM - 9:00 AM
Use of EBIC to probe PSF and MTF on full infrared focal plane arrays
Author(s): **Nicolas Baier**, **Samantha Bustillos Vasco, Olivier Gravrand,** CEA-LETI (France)

13469-35 • 9:00 AM - 9:20 AM
Space-qualified technologies at LYNRED
Author(s): **Nicolas Péré-Laperne**, **Samuel Ducret**, **Franck Perrier**, **Laurent Rubaldo**, **Philippe Chorier,** Lynred (France); **Axel Evirgen**, **Gabin Gregoire,** III-V Lab (France); **Cyril Cervera,** CEA-LETI (France); **Nicolas Jamin,** Lynred (France)

13469-36 • 9:20 AM - 9:40 AM
Latest advancements in bandgap engineered MCT for HOT MW and low dark current arrays at Leonardo UK
Author(s): **Dominic Kwan**, **Vinita Mittal**, **Chris Maxey**, **Ian Baker**, **Les Hipwood**, **Sudesh Bains**, **Marcus Lee, Andrew Reed,** Leonardo UK Ltd. (United Kingdom)

Coffee Break 9:40 AM - 10:10 AM

SESSION 10: MCT/III-V FOCAL PLANE ARRAYS AND ROICS II

16 April 2025 • 10:10 AM - 12:20 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Andrew D. Hood**, Attollo Engineering, LLC (United States); **Laurent Rubaldo**, Lynred (France)

13469-37 • 10:10 AM - 10:40 AM
Sub-10μm extended MWIR technologies development at LYNRED *(Invited Paper)*
Author(s): **Laurent Rubaldo**, **Cécile Grezes**, **Nicolas Morisset**, **Nicolas Péré-Laperne**, **Gulnar Dagher**, **Alexandre Brunner**, **Christine Cassillo**, **Eric Havard**, **Magalie Maillard**, **Alexandra Blay,** Lynred (France); **Clément Lobre**, **Olivier Gravrand**, **Cyril Cervera,** CEA-LETI (France); **Axel Evirgen**, **Jean-Luc Reverchon,** III-V Lab. (France); **Pierre Jenouvrier,** Lynred (France)

13469-38 • 10:40 AM - 11:00 AM
LYNRED's SWAP product lines using the high operating temperature technology
Author(s): **Yann Reibel**, **Nicolas Péré-Laperne**, **Alexandre Brunner**, **Anais Saintoyant**, **Alexis Collier**, **Jérome Coussement, Adrien Bertrand,** Lynred (France)

13469-39 • 11:00 AM - 11:20 AM
MBE growth and characterization of III-Sb-based bulk alloy nBn infrared photodetector structures on 200-mm substrates
Author(s): **Amy W. K. Liu**, **Joel M. Fastenau**, **Scott A. Nelson**, **Scott Cramb**, **Evyn L. Routh**, **Kathryn E. Sautter**, **Rytis Dargis, Will Black,** IQE, Inc. (United States)

13469-40 • 11:20 AM - 11:40 AM
Surface passivation for InAs and InAs/InAsSb T2SL photodetectors
Author(s): **Vicky Zhang**, **Jongwoo Kim**, **Henry Yuan**, **Carl Meyer**, **Mike R. Meixell**, **Witold Czelen**, **Eli Sullivan**, **Gary Apgar**, **Devon Myers**, **Jeremy Palmer**, **Paul Mark**, **Mark Bracey**, **Joyce Laquindanum, Ravi Guntupalli,** Teledyne Judson Technologies (United States)

13469-41 • 11:40 AM - 12:00 PM
New ROIC developments at SUI
Author(s): **John C. Liobe**, **Krishna Linga**, **Michael J. Evans**, **John Wieners**, **John Tagle**, **Sean Houlihan, Brendan Murphy,** Sensors Unlimited, a Collins Aerospace Co. (United States)

13469-42 • 12:00 PM - 12:20 PM
10-μm pitch CTIA readout family for InGaAs and QD SWIR sensors
Author(s): **Kendall Esparza**, **Sean McCotter**, **Brian Ratledge**, **William Korth**, **Nishant Dhawan, Thomas Poonnen,** Senseeker (United States)

Lunch/Exhibition Break 12:20 PM - 1:50 PM

SESSION 11: SYSTEMS

16 April 2025 • 1:50 PM - 3:40 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Nansheng Tang**, L3Harris Technologies, Inc. (United States)

13469-43 • 1:50 PM - 2:20 PM
RAIVEN: A model-based product line engineered approach to intelligent EO/IR sensing *(Invited Paper)*
Author(s): **Aaron Maestas,** Raytheon (United States)

13469-44 • 2:20 PM - 2:40 PM
Cross-domain few-shot object detection in infrared images using prompt tuning for vision and language models
Author(s): **Shotaro Miwa**, **Shun Otsubo**, **Jia Qu, Yasuaki Susumu,** Mitsubishi Electric Corp. (Japan)

13469-45 • 2:40 PM - 3:00 PM
New Lynred engine solution for optical gas imaging
Author(s): **Adrien Bertrand**, **Gabriel Jobert**, **Charlene Lefevre**, **Nicolas Vannier**, **Benoit Louvat, Eric Mallet,** Lynred (France)

13469-46 • 3:00 PM - 3:20 PM
Puddle depth estimation method for autonomous driving system on unpaved road
Author(s): **Yukinori Okamura**, **Kazuya Monden**, **Shohei Yamashita**, **Iori Hashimoto,** Ritsumeikan Univ. (Japan); **Yuki Uetsuki**, **Kazuhiro Furuhashi,** Suzuki Motor Corp. (Japan); **Yohei Fukumizu,** Ritsumeikan Univ. (Japan)

13469-47 • 3:20 PM - 3:40 PM
Low-cost low-SWaP day/night capable SWIR star-tracker for terrestrial navigation applications
Author(s): **Binh-Minh Nguyen**, **Nigel Stepp**, **David Needelman**, **Michael Hooi,** HRL Labs., LLC (United States); **Rongsheng Li**, **David K. Mefford**, **Cody Gruebele**, **Alberto Perez**, **Tom Tsao**, **Chang J. Yoo, Gabriel Bonilla,** The Boeing Co. (United States)

Coffee Break 3:40 PM - 4:10 PM

SESSION 12: MACHINE LEARNING FOR INFRARED SENSING: JOINT SESSION WITH CONFERENCES 13463 AND 13469

16 April 2025 • 4:10 PM - 5:10 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Michael T. Eismann**, Air Force Research Lab. (United States); **Timothy L. Overman**, Prime Solutions Group, Inc. (United States)

13469-48 • 4:10 PM - 4:30 PM
Multispectral optical zoom camera system using two fix-focus lenses
Author(s): **Martin Gerken,** HENSOLDT Optronics GmbH (Germany)

13463-6 • 4:30 PM - 4:50 PM
Comparing Methods of UAV Detection and Tracking Based on Low-Cost 3D LiDAR
Author(s): **Corentin Lanusse-Malhéné**, **Benjamin Pannetier,** CS Group (France); **Nicolas Rivière,** ONERA (France); **Olivier Bartheye,** Ctr. de Recherche de l'École de l'Air (France); **Anita Schilling,** ONERA (France); **Lionel Gardenal,** CS Group (France)

13463-16 • 4:50 PM - 5:10 PM
Real-time uniform identification in video rate snapshot hyperspectral imaging
Author(s): **Kenton Kwok**, **Daniel A. C. Pearce**, **James Whicker**, **Elvira Castello**, **Nikhil Jawade**, **Chris Wood, Steve Chappell,** Living Optics (United Kingdom)

Thursday 17 April 2025

SESSION 13: CRYOCOOLERS I

17 April 2025 • 8:00 AM - 9:50 AM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Alexander Veprik**, Cryo Tech Ltd. (Israel); **Christophe Vasse**, Thales LAS France SAS (France)
8:00 AM: Opening Remarks

13469-50 • 8:10 AM - 8:30 AM
Moving magnet actuator for ultra-low SWAP+C linear free piston compressor of Stirling type cryocooler
Author(s): **Alexander Veprik, Dan Cohen,** CryoTech Ltd. (Israel)

13469-51 • 8:30 AM - 8:50 AM
Ultra low SWAP cryocooler for HOT IR detectors
Author(s): **Alexander Veprik,** CryoTech Ltd. (Israel); **David Gedeon,** Sage Associates (United States)

13469-52 • 8:50 AM - 9:10 AM
Extended linear cryocooler development process: accelerating time-to-market and enhancing performance
Author(s): **Royee Bustan**, **Ori Sela**, **Sigal Lavenda**, **Shlomi Shitrit**, **Ilan Nachman, Victor Segal,** RICOR Cryogenic & Vacuum Systems (Israel)

13469-53 • 9:10 AM - 9:30 AM
Characterization of a linear piston compressor using a ring-down test
Author(s): **Marcellin Perceau,** Safran Electronics & Defense (France); **Danny Cohen,** CryoTech Ltd. (Israel); **Bertrand Cottereau,** Safran Electronics & Defense (France); **Samuel Kurucz, Alexander Veprik,** CryoTech Ltd. (Israel)

13469-54 • 9:30 AM - 9:50 AM
Standard mission profiles for Thales cooler reliability estimation
Author(s): **Christophe Vasse**, **Sylvain Lassalle**, **Simon-Didier Venzal**, **Geoffrey Maratona, Emilien Durupt,** Thales LAS France SAS (France)

Coffee Break 9:50 AM - 10:20 AM

SESSION 14: CRYOCOOLERS II

17 April 2025 • 10:20 AM - 11:40 AM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Christophe Vasse**, Thales LAS France SAS (France); **Alexander Veprik**, Cryo Tech Ltd. (Israel)

13469-55 • 10:20 AM - 10:40 AM
Ricor's new generation of linear cryocoolers reliability overview and development guidelines
Author(s): **Edita Shekhter,** RICOR Cryogenic & Vacuum Systems (Israel)

13469-56 • 10:40 AM - 11:00 AM
Advances in cryo-cooler technology/business model at L3-Harris
Author(s): **Robert A. Jones**, **Michael Ratliff**, **Josh Millward**, **Andrew Mondy**, **John Colston, Douglas DePaoli,** L3Harris Technologies, Inc. (United States)

13469-57 • 11:00 AM - 11:20 AM
Crycooler research at Imtek Cryogenics
Author(s): **Izgin Ozdas,** Imtek Cryogenics (Turkey), Univ. of Cambridge (United Kingdom); **Engin Ozdas,** Imtek Cryogenics (Turkey)

13469-58 • 11:20 AM - 11:40 AM
Coldfinger heat losses of miniature Stirling cryocoolers
Author(s): **Izgin Ozdas,** Imtek Cryogenics (Turkey); **Mehmet Can Cetinkaya,** Imtek Cryogenics (Turkey), Turkish Aerospace Industries, Inc. (Turkey); **Zekeriya Saglam**, **Ersan Hakyemez, Engin Ozdas,** Imtek Cryogenics (Turkey)

Lunch/Exhibition Break 11:40 AM - 1:00 PM

SESSION 15: CRYOCOOLERS III

17 April 2025 • 1:00 PM - 2:40 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Alexander Veprik**, CryoTech Ltd. (Israel); **Christophe Vasse**, Thales LAS France SAS (France)

13469-59 • 1:00 PM - 1:20 PM
High-efficiency micro-class drive electronics for next-generation ultra-low SWaP cryocoolers
Author(s): **Carl S. Kirkconnell**, **Michael P. Darlington**, **Kenneth T. Booth**, **Noah A. Hudson,** West Coast Solutions (United States); **Alexander Veprik,** CryoTech Ltd. (Israel)

13469-60 • 1:20 PM - 1:40 PM
SF070: modular cryocooler for harsh environments and high MTTF
Author(s): **Ingo N. Rühlich**, **Marcel Nussberger**, **Carsten Rosenhagen**, **Markus Mai, Saskia Fischer,** AIM Infrarot-Module GmbH (Germany)

13469-61 • 1:40 PM - 2:00 PM
New AIM SL450 Stirling-type cryocooler
Author(s): **Ingo N. Rühlich**, **Marcel Nussberger**, **Markus Mai**, **Carsten Rosenhagen**, **Andreas Withopf, Johannes Rapp,** AIM Infrarot-Module GmbH (Germany)

13469-62 • 2:00 PM - 2:20 PM
Reliability approach for high-availability cryocoolers
Author(s): **Daniel Willems**, **Hidde Schot**, **Jeroen Mullié, Garmt De Jonge,** Thales Cryogenics B.V. (Netherlands)

13469-63 • 2:20 PM - 2:40 PM
Cryocooler MTTF prediction for HOT detector
Author(s): **James Zhan,** KT Photonics Inc. (Canada)

PANEL DISCUSSION: CRYOCOOLERS

17 April 2025 • 2:40 PM - 3:30 PM | Osceola Ballroom B, Ballroom Level

View Full Details: spie.org/dcs/cryocoolers-panel

Join this panel comprising top-level users and customers of cryogenic technologies.

Moderator:
Carl S. Kirkconnell, President, West Coast Solutions (United States)

Panelists:
Oğuz Altun, Director, ASELSAN A.S. (Turkey)
Ted Conrad, Teledyne FLIR LLC (United States)
Eric Costard, CTO, IRnova AB (Sweden)
Nathan Greenwood, Lockheed Martin Corp., Santa Barbara Focalplane (United States)
Ingo Rühlich, AIM Infrarot-Module GmbH (Germany)
Victor Segal, RICOR Cryogenic & Vacuum Systems (United States)
Christophe Vasse, Thales LAS France SAS (France)
Alexander Veprik, CryoTech Ltd. (Israel)

Coffee Break 3:30 PM - 3:50 PM

SESSION 16: SENSOR TECHNOLOGIES

17 April 2025 • 3:50 PM - 5:30 PM | Osceola Ballroom B, Ballroom Level
Session Chair(s): **Jagmohan Bajaj**, DEVCOM Army Research Lab. (United States)

13469-64 • 3:50 PM - 4:10 PM
Ultra-sensitive CMOS sensor - Xsens
Author(s): **Ofer Nesher,** Elbit Systems Ltd. (Israel)

13469-65 • 4:10 PM - 4:30 PM
Linear and circular polarization sensing in the mid- and longwave infrared regimes
Author(s): **Gergo P. Szakmany**, **Hadrian Aquino**, **Edward C. Kinzel**, **Gary H. Bernstein**, **Alexei O. Orlov, Wolfgang Porod,** Univ. of Notre Dame (United States)

13469-66 • 4:30 PM - 4:50 PM
Sb_2Te_3-Bi_2Te_3 antenna-coupled thermoelectric THz detectors
Author(s): **Rumana Zahir,** Univ. of Central Florida (United States); **Zakariya Mohayman,** Department of Materials Science and Engineering, University of Central Florida, Orlando FL 32816 (United States); **F. Javier González**, **Tanvir Hasan**, **Keqi Qin**, **Kalpathy Sundaram**, **Warut Labnongsaeng**, **Masahiro Ishigami, Robert Peale,** Univ. of Central Florida (United States)

13469-67 • 4:50 PM - 5:10 PM
Visible light enhances the photoresponse of Si-based Schottky photodetectors in the MWIR region
Author(s): **Ting-Kai Chang**, **Jen-Kuei Tang**, **Yao-Han Dong**, **Han-Shi Weng**, **Wei-Cheng Hsu, Ching-Fuh Lin,** National Taiwan Univ. (Taiwan)

13469-68 • 5:10 PM - 5:30 PM
Resonant cavity enhancement of graphene-based Schottky barrier photodiodes
Author(s): **Maryam Alsaud, Andrew Sarangan,** Univ. of Dayton (United States)

CONFERENCE 13470

CONFERENCE CO-SPONSOR

Thermosense: Thermal Infrared Applications XLVII

15 - 17 April 2025 | Naples 1, Ballroom Level

Conference Chair(s): **Giovanni Ferrarini,** Istituto per le Tecnologie della Costruzione (Italy); **Peter Spaeth,** NASA Langley Research Ctr. (United States); **Fernando López,** INO (Canada)

Program Committee: **Nicolas P. Avdelidis,** Univ. of Southampton (United Kingdom); **Michael C. Borish,** Oak Ridge National Lab. (United States); **L. Terry Clausing,** Drysdale and Associates, Inc. (United States); **Jaap de Vries,** FM Global (United States); **Marc Genest,** National Research Council Canada (Canada); **Sheng-Jen Hsieh,** Texas A&M Univ. (United States); **Timo T. Kauppinen,** Arctic Construction Cluster Finland (Finland); **Xavier P. V. Maldague,** Univ. Laval (Canada); **Arantza Mendioroz,** Univ. of the Basque Country (Spain); **Junko Morikawa,** Tokyo Institute of Technology (Japan); **Gary L. Orlove,** Thermal Imaging Consultant (United States); **Beate Oswald-Tranta,** Montan Univ. Leoben (Austria); **Davide Palumbo,** Politecnico di Bari (Italy); **Ralph A. Rotolante,** Vicon Infrared (United States); **Andrés Esteban Rozlosnik,** SI Termografía Infrarroja (Argentina); **Takahide Sakagami,** Kobe Univ. (Japan); **Steven M. Shepard,** Thermal Wave Imaging, Inc. (United States); **Sami Siikanen,** VTT Technical Research Ctr. of Finland Ltd. (Finland); **Gregory R. Stockton,** Stockton Infrared Thermographic Services, Inc. (United States); **Gary E. Strahan,** Infrared Cameras, Inc. (United States); **Joseph N. Zalameda,** NASA Langley Research Ctr. (United States)

Monday 14 April 2025

THERMOSENSE VENDOR SESSION

14 April 2025 • 1:00 PM - 5:00 PM | Tampa 2, Ballroom Level

View Full Details: spie.org/dcs/thermosense-vendor-session

The Thermosense Vendor Session provides an early opportunity for exhibitors to highlight their latest technologies and newest products to the infrared industry and the SPIE Defense + Commercial Sensing technical audience prior to the opening of the exhibition.

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 10:50 AM

SESSION 1: ARTIFICIAL INTELLIGENCE AND NDE4.0 IN IRT I

15 April 2025 • 10:50 AM - 12:20 PM | Naples 1, Ballroom Level

Session Chair(s): **Peter W. Spaeth**, NASA Langley Research Ctr. (United States); **Femando López**, INO (Canada)

10:50 AM: Opening Remarks

13470-1 • 11:00 AM - 11:20 AM

Deep-learning-based crack detection and length determination for inductive thermography inspections on Inconel 718 and Haynes 282 TIG welded components

Author(s): **Ander Muniategui**, **Eider Gorostegui-Colinas**, **Angel Cifuentes**, **Ander González Conde**, **Jose Manuel Ruiz Lorite,** Lortek S.Coop. (Spain); **Beate Oswald-Tranta,** University of Leoben (Austria)

13470-2 • 11:20 AM - 11:40 AM

Real-time thermographic monitoring for automated defect detection in welding

Author(s): **Luca Santoro, Raffaella Sesana,** Politecnico di Torino (Italy)

13470-3 • 11:40 AM - 12:00 PM

Development of AI algorithms for quantifying defects with the step thermography

Author(s): **Tiziana Matarrese**, **Davide Palumbo,** Politecnico di Bari (Italy); **Luis Antonio Felipe Sesé**, **Ángel Jesus Molina Viedma**, **Francisco Alberto Díaz Garrido** , **Elías López-Alba,** Univ. de Jaén (Spain); **Umberto Galietti,** Politecnico di Bari (Italy)

13470-4 • 12:00 PM - 12:20 PM

Comparative evaluation of ResNet50 and MobileNet feature extractors for tomato leaf disease classification using MLP

Author(s): **Md Sami Ul Hoque**, **Julian Rene Cuellar Buritica**, **Al Mahmud**, **Mahdi Kargar Nigjeh**, **Robert LeAnder, Scott E. Umbaugh,** Southern Illinois Univ. Edwardsville (United States)

Lunch/Exhibition Break 12:20 PM - 1:50 PM

SESSION 2: MULTISPECTRAL, HYPERSPECTRAL, AND MULTI-IMAGING TECHNIQUES

15 April 2025 • 1:50 PM - 3:30 PM | Naples 1, Ballroom Level

Session Chair(s): **Giovanni Ferrarini**, Istituto per le Tecnologie della Costruzione (Italy); **Joseph N. Zalameda**, NASA Langley Research Ctr. (United States)

13470-101 • 1:50 PM - 2:30 PM

Multiwavelength thermometry without a priori emissivity information: from promise to disillusionment (Keynote Presentation)

Author(s): **Jean-Claude Krapez,** ONERA (France)

13470-5 • 2:30 PM - 2:50 PM

Multispectral fusion-based crack detection using automated laser thermography inspection

Author(s): **Sruthi Krishna Kunji Purayil**, **Philipp D. Hirsch**, **Julien Lecompagnon, Mathias Ziegler,** Bundesanstalt für Materialforschung und -prüfung (Germany)

13470-6 • 2:50 PM - 3:10 PM

Micro-thermoreflectometry applied to in situ monitoring of changes in the optical properties of a MCrAlY coating during high-temperature oxidation

Author(s): **Joan Delpech**, **Damien Texier**, **Thomas Pottier, Thierry Sentenac,** L'Institut Clément Ader (France)

13470-7 • 3:10 PM - 3:30 PM
Photo-thermal imaging of newly synthesized high entropy alloys by microscale IR thermography
Author(s): **Junko Morikawa,** Institute of Science Tokyo (Japan); **Meguya Ryu,** National Institute of Advanced Industrial Science and Technology (Japan); **Hsin-hui Huang**, **Saulius Juodkazis,** Swinburne Univ. of Technology (Australia); **Yoshiaki Nishijima,** Yokohama National Univ. (Japan)

Coffee Break 3:30 PM - 4:00 PM

SESSION 3: MANUFACTURING AND PROCESS MONITORING

15 April 2025 • 4:00 PM - 5:20 PM | Naples 1, Ballroom Level
Session Chair(s): **Davide Palumbo**, Politecnico di Bari (Italy); **Marc Genest**, National Research Council Canada (Canada)

13470-8 • 4:00 PM - 4:20 PM
Use of frequency based methods for quantitative evaluation of resistance spot welds
Author(s): **Luca Santoro**, **Valentino Razza, Manuela De Maddis,** Politecnico di Torino (Italy)

13470-42 • 4:20 PM - 4:40 PM
Physics aided artificial intelligence for quantitative prediction of flaw geometry from lock-in thermography experiments
Author(s): **David Sagarduy-Marcos**, **Javier Rodríguez-Aseguinolaza,** Univ. del País Vasco (Spain); **Jean-Christophe Batsale,** Institut de Mathématiques de Marseille, CNRS (France), Univ. de Bordeaux (France), Ecole Nationale Supérieure d'Arts et Métiers (France)

13470-10 • 4:40 PM - 5:00 PM
Comparison of laser and inductive thermography: experimental and numerical approaches for crack detection in metallic components
Author(s): **Stanislas Lech,** ONERA (France), CETIM (France); **Ludovic Gaverina,** ONERA (France); **Patrick Bouteille,** CETIM (France); **Jean-Michel Roche,** ONERA (France); **Yannick Le Maoult,** L'Institut Clément Ader (France); **Laurent Daniel,** Lab. Génie électrique et électronique de Paris (France)

13470-43 • 5:00 PM - 5:20 PM
Background radiation measurement and subtraction for improved non-contact infrared temperature measurement
Author(s): **Benjamin Brosilow**, **Yigal Reiss, Dario Cabib,** CI Systems (Israel) Ltd. (Israel)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13470-39 • 5:30 PM - 7:00 PM
Measuring the in-plane thermal diffusivity of anisotropic materials with lock-in thermography: laser-spot versus laser-line excitation

Author(s): **Adrián Bedoya**, **Ernesto Marín,** Instituto Politécnico Nacional - CICATA (Mexico); **Agustín Salazar, Arantza Mendioroz,** Univ. del País Vasco (Spain)

13470-40 • 5:30 PM - 7:00 PM
In-line monitoring of the fused filament fabrication additive manufacturing process for short and continuous fibre-reinforced composites
Author(s): **Rosanna Forster**, **Antonio Feteira**, **Dimitra Soulioti**, **Evangelos Kordatos,** Sheffield Hallam Univ. (United Kingdom); **Sotirios Grammatikos,** Norwegian Univ. of Science and Technology (Norway)

13470-41 • 5:30 PM - 7:00 PM
JS divergence Weibull embedding for very early breast cancer diagnosis
Author(s): **Leonardo Buitrago**, **Christine Vassell**, **Miguel Martinez**, **Severin Vihossi**, **Harmen Siezen**, **Lan Ma,** Univ. of Maryland, College Park (United States); **Xavier P. V. Maldague,**Univ. Laval (Canada); **Bardia Yousefi,** Univ. of Maryland, College Park (United States)

Wednesday 16 April 2025

SESSION 4: AEROSPACE AND DRONE APPLICATIONS

16 April 2025 • 8:30 AM - 10:20 AM | Naples 1, Ballroom Level
Session Chair(s): **Nicolas Peter Avdelidis**, Univ. of Southampton (United Kingdom); **Takahide Sakagami**, Kobe Univ. (Japan)

8:30 AM: Opening Remarks

13470-12 • 8:40 AM - 9:00 AM
Influence of propeller downwash on drone-based active infrared thermographic inspection
Author(s): **Marc Genest**, **Shashank Pant, Dmitrii Klishch,** National Research Council Canada (Canada)

13470-13 • 9:00 AM - 9:20 AM
An instrumentation-based methodology to support estimation of aircraft wheel and brake assembly temperature and pressure
Author(s): **Lusitha Shyamal Ramachandra**, **Fakhre Ali**, **Steve King**, **Henrique Fernandes**, **Ian Jennions**, **Martin Skote, Nicolas Avdelidis,** Cranfield Univ. (United Kingdom)

13470-14 • 9:20 AM - 9:40 AM
Advanced diagnostics of aircraft structures using automated non-invasive imaging techniques
Author(s): **Konstantinos Bardis,** Cranfield Univ. (United Kingdom); **Nicolas Avdelidis,** Univ. of Southampton (United Kingdom); **Henrique Fernandes,** Cranfield Univ. (United Kingdom); **Clemente Ibarra-Castanedo, Xavier Maldague,** Univ. Laval (Canada)

13470-15 • 9:40 AM - 10:00 AM
Experiences from thermal drone imaging field campaign for developing automated tailing pond monitoring
Author(s): **Sami Siikanen**, **Timo Lind,** VTT Technical Research Ctr. of Finland Ltd. (Finland); **Erik Ronne,** Boliden AB (Sweden); **Timo T. Kauppinen,** Mutsal (Finland), Arctic Construction Cluster Finland (Finland); **Marko Savolainen, Marko Paavola,** VTT Technical Research Ctr. of Finland Ltd. (Finland)

13470-16 • 10:00 AM - 10:20 AM
Empowering UAV EO systems through innovative low-SWaP high-performance IR optical designs
Author(s): **Nissim Asida, Kobi Lasri,** Ophir Optronics Solutions Ltd. (Israel)

Coffee/Exhibition Break 10:20 AM - 10:50 AM

SESSION 5: NONDESTRUCTIVE TESTING AND EVALUATION I

16 April 2025 • 10:50 AM - 12:10 PM | Naples 1, Ballroom Level
Session Chair(s): **Michael C. Borish**, Oak Ridge National Lab. (United States); **Jaap de Vries**, FM Global (United States)

13470-17 • 10:50 AM - 11:10 AM
Reconstruction of spatial and time-series 4D imaging of leaked gas distribution using infrared images of multiple optical paths
Author(s): **Takahide Sakagami**, **Daiki Shiozawa, Shiro Kubo,** Kobe Univ. (Japan)

13470-18 • 11:10 AM - 11:30 AM
Damage evaluation with thermal methods of 3D-printed notched composite materials
Author(s): **Davide Palumbo**, **Ester D'Accardi,** Politecnico di Bari (Italy); **Rosa De Finis,** Univ. del Salento (Italy); **Alfonso Pagani**, **Enrico Zappino,** Politecnico di Torino (Italy); **Umberto Galietti,** Politecnico di Bari (Italy)

13470-19 • 11:30 AM - 11:50 AM
In-situ inspection of laser powder bed fusion Ti-6AL-4V additive manufacturing using an infrared sensor
Author(s): **Joseph N. Zalameda**, **Samuel J. Hocker**, **Peter W. Spaeth, Brandon Widener,** NASA Langley Research Ctr. (United States)

13470-20 • 11:50 AM - 12:10 PM
Hybrid image enhancement for thermographic imaging in canine bone cancer detection
Author(s): **Md Sami Ul Hoque**, **Swapnil Biswas**, **Md Sadman Sakib**, **Robert LeAnder, Scott E. Umbaugh,** Southern Illinois Univ. Edwardsville (United States)

IN MEMORIAM: RALPH DINWIDDIE AND RALPH ROTOLANTE

16 April 2025 • 12:10 PM - 12:20 PM | Naples 1, Ballroom Level
Join this special in-memoriam session for Ralph Dinwiddie and Ralph Rotolante.

Lunch/Exhibition Break 12:20 PM - 1:50 PM

SESSION 6: ARTIFICIAL INTELLIGENCE AND NDE4.0 IN IRT II

16 April 2025 • 1:50 PM - 3:30 PM | Naples 1, Ballroom Level
Session Chair(s): **Xavier P.V. Maldague**, Univ. Laval (Canada); **Gary E. Strahan**, Infrared Cameras, Inc. (United States)

13470-21 • 1:50 PM - 2:10 PM
Comparative analysis of traditional thermographic image processing and deep learning models for canine bone cancer detection
Author(s): **Md Sami Ul Hoque**, **Al Mahmud**, **Thien Huu Nguyen**, **Syed Muhammad Mahdi Raza**, **Robert LeAnder, Scott E. Umbaugh,** Southern Illinois Univ. Edwardsville (United States)

13470-22 • 2:10 PM - 2:30 PM
AI-driven dimensionality reduction for infrared thermography in the aerospace NDE 4.0
Author(s): **Mohammed Salah, Yusra Abdulrahman,** Khalifa Univ. (United Arab Emirates)

13470-23 • 2:30 PM - 2:50 PM
Leveraging fine-tuned large language models for enhanced infrared-based defect detection
Author(s): **Mohamed Arbane**, **Xavier Maldague,** Univ. Laval (Canada); **Yacine Yaddaden,** Univ. du Québec à Rimouski (Canada); **Clemente Ibarra-Castanedo,** Univ. Laval (Canada); **Pierre Servais,** Magnetico Polissage de Precision (Belgium)

13470-24 • 2:50 PM - 3:10 PM
Estimating composite bond line properties in composite structures using variational autoencoder inverse mapper
Author(s): **Peter W. Spaeth,** NASA Langley Research Ctr. (United States); **Yaohang Li,** Old Dominion Univ. (United States)

13470-44 • 3:10 PM - 3:30 PM **(CANCELLED)**
ADAS-ThermalNet: A real-time object detection framework for autonomous driving using thermal imaging and deep learning
Author(s): **Noor E. Karishma Shaik**, **Nandakishor Desai**, **Nathan Ruslim, Marimuthu Palaniswami,** The Univ. of Melbourne (Australia)

Coffee Break 3:30 PM - 4:00 PM

SESSION 7: BUILDINGS AND CULTURAL HERITAGE

16 April 2025 • 4:00 PM - 4:40 PM | Naples 1, Ballroom Level
Session Chair(s): **Giovanni Ferrarini**, Istituto per le Tecnologie della Costruzione (Italy)

13470-25 • 4:00 PM - 4:20 PM
IRT method for analyzing moisture diffusion and capillary rising damp in masonry materials
Author(s): **Erika Guolo,** Univ. Iuav di Venezia (Italy); **Paolo Bison,** Istituto per le Tecnologie della Costruzione, Consiglio Nazionale delle Ricerche (Italy); **Paolo Ruggeri, Fabio Peron,** Univ. Iuav di Venezia (Italy)

13470-11 • 4:20 PM - 4:40 PM
A preliminary assessment of coatings for metal-based evaporative heat transfer surfaces
Author(s): **Paolo Bison,** Istituto per le Tecnologie della Costruzione, Consiglio Nazionale delle Ricerche (Italy); **Alessandro Bortolin**, **Gianluca Cadelano,** Istituto di Scienze dell'Atmosfera e del Clima, Consiglio Nazionale delle Ricerche (Italy); **Michele Cossu**, **Salvatore Cristiano,** Univ. degli Studi di Modena e Reggio Emilia (Italy); **Giovanni Ferrarini,** Istituto per le Tecnologie della Costruzione, Consiglio Nazionale delle Ricerche (Italy); **Nicolò Morselli,** Univ. degli Studi di Modena e Reggio Emilia (Italy); **Stefano Rossi,** Istituto per le Tecnologie della Costruzione, Consiglio Nazionale delle Ricerche (Italy)

THERMOSENSE COMMITTEE MEETING

16 April 2025 • 4:50 PM - 5:50 PM | Room not published
The committee for the Thermosense conference will gather and meet at this time.

Thursday 17 April 2025

SESSION 8: THERMAL PROPERTIES

17 April 2025 • 8:40 AM - 10:00 AM | Naples 1, Ballroom Level
Session Chair(s): **Peter W. Spaeth**, NASA Langley Research Ctr. (United States); **Giovanni Ferrarini**, Istituto per le Tecnologie della Costruzione (Italy)

13470-28 • 8:40 AM - 9:00 AM
Characterization of horizontal metallic inserts embedded in insulating matrix using photothermal radiometry: a 1D approximation
Author(s): **Arantza Mendioroz**, **Jorge Gil, Agustín Salazar,** Univ. del País Vasco (Spain)

13470-29 • 9:00 AM - 9:20 AM
Differential imaging of thermal properties for composite materials based on laser-periodic-heating method using lock-in thermography
Author(s): **Ryohei Fujita,** Nagoya Univ. (Japan)

13470-31 • 9:20 AM - 9:40 AM
Non-destructive thermographic evaluation of thermal diffusivity in additively manufactured fiber-reinforced composites using low-cost cooling: an early-stage analysis
Author(s): **Giuseppe Dell'Avvocato,** Univ. degli Studi dell'Aquila (Italy); **Alexey Moskovchenko,** Univ. of West Bohemia (Czech Republic); **Fabrizio Sarasini,** Sapienza Univ. di Roma (Italy); **Giampaolo D'Alessandro**, **Edoardo Mancini, Stefano Sfarra,** Univ. degli Studi dell'Aquila (Italy)

13470-32 • 9:40 AM - 10:00 AM
Computational fluid dynamics and heat transfer coupled finite element analysis of pulse phase thermography for horizontal, vertical, and inclined composite plates
Author(s): **Saul H. Valle,** Naval Surface Warfare Ctr. Dahlgren Div. (United States)

Coffee Break 10:00 AM - 10:30 AM

SESSION 9: NONDESTRUCTIVE TESTING AND EVALUATION II

17 April 2025 • 10:30 AM - 12:30 PM | Naples 1, Ballroom Level
Session Chair(s): **Arantza Mendioroz**, Univ. del País Vasco (Spain); **Fernando López**, INO (Canada)

13470-38 • 10:30 AM - 10:50 AM
Automated thermographic inspection of radioactive waste drums
Author(s): **Anton Averin**, **Philipp D. Hirsch, Julien Lecompagnon,** Bundesanstalt für Materialforschung und -prüfung (Germany)

13470-33 • 10:50 AM - 11:10 AM
Novel structural health monitoring strategies and procedures based on thermal methods for the damage characterization of 3D-printed composite materials
Author(s): **Ester D'Accardi**, **Davide Palumbo,** Politecnico di Bari (Italy); **Rosa De Finis,** Univ. del Salento (Italy); **Umberto Galietti,** Politecnico di Bari (Italy)

13470-34 • 11:10 AM - 11:30 AM
Automated damage detection of aeronautical composite materials by multimodal inspection techniques
Author(s): **Georges Giakoumakis**, **Pauline Trouvé**, **Ludovic Gaverina, Jean-Michel Roche,** ONERA (France)

13470-35 • 11:30 AM - 11:50 AM
A first step towards automating non-destructive thermal diffusivity measurement by pulsed laser spot thermography: a numerical approach
Author(s): **Giuseppe Dell'Avvocato,** Univ. degli Studi dell'Aquila (Italy)

13470-37 • 11:50 AM - 12:10 PM
Multi-scale inspection flying spot thermography for enhanced detection of fatigue cracks in aeronautical components
Author(s): **Ludovic Gaverina**, **Pierre Beauchêne** , **Stanislas Lech, Jean-Michel Roche,** ONERA (France)

13470-36 • 12:10 PM - 12:30 PM
Single-sided estimates of surface breaking porosity in additive manufacturing using multiple inspection techniques
Author(s): **Peter W. Spaeth**, **Erik Frankforter, Joseph N. Zalameda,** NASA Langley Research Ctr. (United States)

BEST STUDENT PAPER AWARD ANNOUNCEMENT

17 April 2025 • 12:30 PM - 12:40 PM | Naples 1, Ballroom Level

Join us as we announce the Thermosense Best Student Paper Award winner.

Award sponsored by:
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CONFERENCE 13471

Radar Sensor Technology XXIX

14 - 16 April 2025 | Sanibel 3, Ballroom Level

Conference Chair(s): **Abigail S. Hedden,** U.S. Army Combat Capabilities Development Command (United States); **Gregory J. Mazzaro,** The Citadel-The Military College of South Carolina (United States)

Program Committee: **Jeffrey Barber,** U.S. Dept. of Homeland Security (United States); **Matthew J. Brandsema,** Applied Research Lab., The Pennsylvania State Univ. (United States); **Armin W. Doerry,** Sandia National Labs. (United States); **Ryan A. Elwell,** DEVCOM C5ISR (United States); **Mark Govoni,** DEVCOM Army Research Lab. (United States); **Sevgi Zubeyde Gurbuz,** The Univ. of Alabama (United States); **Colin D. Kelly,** DEVCOM Army Research Lab. (United States); **Seong-Hwoon Kim,** Spartan Radar (United States); **Bingcheng C. Li,** Lockheed Martin Corp. (United States); **Claire Migliaccio,** Univ. Côte d'Azur (France); **Ram M. Narayanan,** The Pennsylvania State Univ. (United States); **Marius Necsoiu,** U.S. Army Research Lab. (United States); **Lam H. Nguyen,** DEVCOM Army Research Lab. (United States); **Chandra S. Pappu,** Union College (United States); **Zhengyu Peng,** Aptiv (United States); **Brian R. Phelan,** DEVCOM Army Research Lab. (United States); **Thomas J. Pizzillo,** U.S. Naval Research Lab. (United States); **Zhijun Qiao,** The Univ. of Texas Rio Grande Valley (United States); **Kenneth I. Ranney,** DEVCOM Army Research Lab. (United States); **Ann Marie Raynal,** Sandia National Labs. (United States); **Duncan A. Robertson,** Univ. of St. Andrews (United Kingdom); **Davi V.Q. Rodrigues,** The Univ. of Texas at El Paso (United States); **David Tahmoush,** The MITRE Corp. (United States); **Aleksi A. Tamminen,** Aalto Univ. (Finland); **Julio V. Urbina,** The Pennsylvania State Univ. (United States); **David A. Wikner,** DEVCOM Army Research Lab. (United States); **Yan Rockee Zhang,** The Univ. of Oklahoma (United States)

Monday 14 April 2025

CHAIR WELCOME AND 2024 AWARDS

14 April 2025 • 10:10 AM - 10:20 AM | Sanibel 3, Ballroom Level
Session Chair(s): **Gregory J. Mazzaro**, The Citadel-The Military College of South Carolina (United States)

Join the chairs for the 2025 opening welcome and recognition of the 2024 early career research award recipients.

SESSION 1: ALGORITHMS AND PROCESSING TECHNIQUES

14 April 2025 • 10:20 AM - 12:00 PM | Sanibel 3, Ballroom Level
Session Chair(s): **Gregory J. Mazzaro**, The Citadel-The Military College of South Carolina (United States)

13471-1 • 10:20 AM - 10:40 AM
A comparison of nearest neighbor pixel deconvolution and spatial variant apodization for image enhancement in synthetic aperture radar imagery
Author(s): **Jonathan Cain**, **Yu Wang**, **Tom Medl**, **Patrick Kano, Yeshayahu Israeli,** Raytheon (United States)

13471-2 • 10:40 AM - 11:00 AM
Data-driven ad hoc signal subspace imaging in unknown multipath environments
Author(s): **Edwin A. Marengo, Daniel P. Chu,** Northeastern Univ. (United States)

13471-3 • 11:00 AM - 11:20 AM
3D chirogram: a voxel pursuit approach for frequency modulation signal analysis
Author(s): **Bingcheng Li,** Lockheed Martin Corp. (United States)

13471-23 • 11:20 AM - 11:40 AM
Multi-target OFDM ranging performance in cluttered environments with interference
Author(s): **Mehmet Yazgan**, **Shivani Sharma,** Univ. of South Florida (United States); **Huseyin Arslan,** Medipol Univ. (Turkey); **Stavros Vakalis,** Univ. of South Florida (United States)

13471-24 • 11:40 AM - 12:00 PM
Investigating information elasticity in complex trajectory state estimation using particle filters

Author(s): **Youngmin Kim**, **Ram M. Narayanan,** The Pennsylvania State Univ. (United States); **Muralidhar Rangaswamy,** Air Force Research Lab. (United States)

Lunch Break 12:00 PM - 2:00 PM

SESSION 2: PHENOMENOLOGY

14 April 2025 • 2:00 PM - 3:00 PM | Sanibel 3, Ballroom Level
Session Chair(s): **Yan Rockee Zhang**, The Univ. of Oklahoma (United States); **Bingcheng C. Li**, Lockheed Martin Corp. (United States)

13471-8 • 2:00 PM - 2:20 PM
Advanced synthetic aperture radar imaging with a 2D electronically steered metasurface antenna
Author(s): **Abigail Lee**, **David Smith, Michael Boyarsky,** Duke Univ. (United States)

13471-10 • 2:20 PM - 2:40 PM
Electronic implementation of self-modulating chaotic oscillator and its potential for radar systems
Author(s): **Chandra S. Pappu,** Union College (United States); **Thomas L Carroll,** Naval Research Laboratory (United States)

13471-11 • 2:40 PM - 3:00 PM
Enhancing snow accumulation prediction in radar sensors with neural operators
Author(s): **Maryam Rahnemoonfar, Heling Wang,** Lehigh Univ. (United States)

Coffee Break 3:00 PM - 3:30 PM

SESSION 3: APPLICATIONS AND EXPLOITATION TECHNIQUES

14 April 2025 • 3:30 PM - 4:10 PM | Sanibel 3, Ballroom Level
Session Chair(s): **Chandra S. Pappu**, Union College (United States); **Jonathan Cain**, Raytheon (United States)

13471-5 • 3:30 PM - 3:50 PM
Distributed penetrating UWB radar for inspection of civilian infrastructure: design and analysis
Author(s): **Jorge Alarcon**, **Yan Rockee Zhang**, **Hernan Suarez, Kegan B. Reynolds,** The Univ. of Oklahoma (United States)

13471-6 • 3:50 PM - 4:10 PM
Passive radar based target localization through self-mixing processing and binary search minimization
Author(s): **Justin K. A. Henry, Ram M. Narayanan,** The Pennsylvania State Univ. (United States)

SESSION 4: QUANTUM REMOTE SENSING

14 April 2025 • 4:10 PM - 4:30 PM | Sanibel 3, Ballroom Level
Session Chair(s): **Matthew J. Brandsema**, Applied Research Lab. (United States)

13471-12 • 4:10 PM - 4:30 PM
Standoff Material Characterization and Thermometry via Returning Temporal and Amplitude Statistics Originating from Entangled Photon Pairs
Author(s): **Matthew J. Brandsema**, **Alexander Flubacher, Sky D Semone,** Applied Research Lab. at Penn State (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 5: RADAR MICRO-DOPPLER

15 April 2025 • 11:00 AM - 12:00 PM | Sanibel 3, Ballroom Level
Session Chair(s): **Kevin Chetty**, Univ. College London (United Kingdom)

13471-15 • 11:00 AM - 11:20 AM
Micro-Doppler models of drones, birds, and bird-like drones
Author(s): **Kester Nucum**, **Sabyasachi Biswas, John E. Ball,** Mississippi State Univ. (United States)

13471-16 • 11:20 AM - 11:40 AM
Extending radar micro-Doppler analysis to various types of gait abnormalities
Author(s): **Cunhao Zeng**, **Ram M. Narayanan,** The Pennsylvania State Univ. (United States); **Cayce A. Onks,** PennState Health Milton S. Hershey Medical Ctr. (United States)

13471-17 • 11:40 AM - 12:00 PM
Discriminant analysis of radar micro-Doppler signatures for musculoskeletal injury risk assessment
Author(s): **Jannatul Ferdous**, **Fauzia Ahmad,** Temple Univ. (United States); **Cayce A. Onks,** Penn State College of Medicine (United States)

Lunch/Exhibition Break 12:00 PM - 1:50 PM

SESSION 6: MILLIMETER-WAVE SENSING AND IMAGING

15 April 2025 • 1:50 PM - 3:30 PM | Sanibel 3, Ballroom Level
Session Chair(s): **David A. Wikner**, DEVCOM Army Research Lab. (United States)

13471-19 • 1:50 PM - 2:10 PM
Loaded waveguide dielectric measurements of powdered erythritol tetranitrate
Author(s): **Jeffrey Barber,** U.S. Dept. of Homeland Security (United States); **Zachary Landicini**, **Adam Creswell**, **Wendy B. Ruiz,** Battelle Memorial Institute (United States); **Peter R. Smith,** MAG Aerospace (United States); **Joaquin A. Aparicio-Bolaño,** Battelle Memorial Institute (United States); **James C. Weatherall**, **Duane C. Karns**, **Benjamin P. Wilkins,** U.S. Dept. of Homeland Security (United States); **Hope T. Sartain, Sheana M. Schneidereit,** Signature Science, LLC (United States)

13471-18 • 2:10 PM - 2:30 PM
Addressing privacy and cost challenges in remote patient monitoring with streamlined 60 GHz radar and edge processing
Author(s): **Kevin Chetty**, **Paul Brennan,** Univ. College London (United Kingdom); **Chong Tang,** Univ. of Southampton (United Kingdom); **Lai Bun Lok, Fangzhan Shi,** Univ. College London (United Kingdom)

13471-20 • 2:30 PM - 2:50 PM
Assessing permittivity dependence on inhomogeneities in materials
Author(s): **Carson Ellenwood,** Oak Ridge Institute for Science and Education (United States); **James C. Weatherall, Jeffrey Barber,** U.S. Dept. of Homeland Security (United States)

13471-21 • 2:50 PM - 3:10 PM
Millimeter-wave stepped frequency radar for high-accuracy water-level monitoring
Author(s): **Shivani Sharma**, **Tasin Nusrat**, **Mehmet Yazgan, Stavros Vakalis,** Univ. of South Florida (United States)

13471-22 • 3:10 PM - 3:30 PM
Impact of positioning errors in radar using distributed repeaters
Author(s): **Tasin Nusrat**, **Shivani Sharma, Stavros Vakalis,** Univ. of South Florida (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level

Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13471-30 • 5:30 PM - 7:00 PM
mmWave-SAR dataset: large high-resolution heatmap and point cloud dataset for static object detection and other machine-learning applications
Author(s): **Shuo Wang**, **Zihan Shan**, **Jingjie He**, **Arjun J. Grama**, **John Li, Matthew Caesar,** Univ. of Illinois (United States)

Wednesday 16 April 2025

SESSION 7: SYNTHETIC DATA FOR RADAR APPLICATIONS: JOINT SESSION WITH CONFERENCES 13459 AND 13471

16 April 2025 • 8:40 AM - 10:00 AM | Tampa 2, Ballroom Level
Session Chair(s): **Ryan A. Elwell**, DEVCOM C5ISR (United States); **Keith F. Prussing**, Georgia Tech Research Institute (United States)

13471-27 • 8:40 AM - 9:00 AM
Finite element simulation for synthetic imaging in Advanced Imaging Technology (AIT)
Author(s): **James C. Weatherall,** U.S. Dept. of Homeland Security (United States); **Julian M. Gerber,** Oak Ridge Institute for Science and Education (United States); **Jeffrey Barber,** U.S. Dept. of Homeland Security (United States)

13471-28 • 9:00 AM - 9:20 AM
Automatic classification of radar and communication waveforms through interpretable deep learning
Author(s): **Ali Cafer Gurbuz**, **Bruce Hicks**, **Sabyasachi Biswas, John E Ball,** Mississippi State Univ. (United States)

13459-25 • 9:20 AM - 9:40 AM
Methods for bridging the distribution gap between simulated and measured data
Author(s): **Garrett Decker, Matt Young,** RTX Corp. (United States)

13459-27 • 9:40 AM - 10:00 AM
Advanced EM simulation for synthetic RADAR imagery
Author(s): **Michael Blazej, Nathan Kundtz,** Rendered.ai (United States)

CONFERENCE 13472

Laser Radar Technology and Applications XXX

16 - 17 April 2025 | Osceola 2, Ballroom Level

Conference Chair(s): **Gary W. Kamerman,** FastMetrix Industries, LLC (United States); **Lori A. Magruder,** Center for Space Research, The Univ. of Texas at Austin (United States); **Monte D. Turner,** National Geospatial-Intelligence Agency (United States)

Program Committee: **Hans D. Hallen,** North Carolina State Univ. (United States); **Thomas J. Karr,** The MITRE Corp. (United States); **Charlie M. Kershner,** National Geospatial-Intelligence Agency (United States); **Martin Laurenzis,** Institut Franco-Allemand de Recherches de Saint-Louis (France); **Vasyl Molebny,** Academy of Technological Sciences of Ukraine (Ukraine); **Upendra N. Singh,** NASA Langley Research Ctr. (United States); **Andreas Ullrich,** RIEGL Laser Measurement Systems GmbH (Austria); **Christopher R. Valenta,** Georgia Institute of Technology (United States); **Andre J. van Rynbach,** Air Force Research Lab. (United States)

Wednesday 16 April 2025

WELCOME AND OPENING REMARKS

16 April 2025 • 1:30 PM - 1:40 PM | Osceola 2, Ballroom Level
Session Chair(s): **Gary W. Kamerman**, FastMetrix, Inc. (United States); **Lori A. Magruder**, The Univ. of Texas at Austin (United States)
Join us for the opening and welcome of this year's Laser Radar Technology and Applications conference.

SESSION 1: SPECTRAL AND POLARIMETRIC LIDAR DEVELOPMENT

16 April 2025 • 1:40 PM - 4:10 PM | Osceola 2, Ballroom Level
Session Chair(s): **Lori A. Magruder**, The Univ. of Texas at Austin (United States)

13472-1 • 1:40 PM - 2:10 PM
Spectroscopic infrared reflectance lidar (SpIRRL) for planetary volatile measurements *(Invited Paper)*
Author(s): **Xiaoli Sun,** NASA Goddard Space Flight Ctr. (United States); **Paul G. Lucey,** Univ. of Hawai'i (United States); **Daniel R. Cremons**, **Erwan Mazarico**, **Steven Li**, **Kenji Numata,** NASA Goddard Space Flight Ctr. (United States); **Casey I. Honniball,** Univ. of Maryland, College Park (United States); **Luis A. Ramos-Izquierdo**, **Gregory B. Clarke**, **John F. Cavanaugh,** NASA Goddard Space Flight Ctr. (United States); **William A. Mamakos, Jeffrey A. Guzek,** Design Interface, Inc. (United States)

13472-2 • 2:10 PM - 2:30 PM
Progress towards a polarimeteric frequency-modulated continuous-wave lidar
Author(s): **Steve L. Shea**, **David L. Dickensheets**, **Andrew D. Oliver, Joseph A. Shaw,** Montana State Univ. (United States)

13472-3 • 2:30 PM - 2:50 PM
Multispectral lidar data acquisition at 28 wavelengths on two types of aerosol cloud: getting relative spectral extinction efficiency and backscattering-to-extinction ratio
Author(s): **Gregoire Tremblay,** Defence Research and Development Canada, Valcartier (Canada)

Coffee Break • 2:50 PM - 3:20 PM

13472-4 • 3:20 PM - 3:40 PM
Processing dual-polarization lidar data with the wavelet transform for bathymetric measurements
Author(s): **Brandon M. Kallenback,** Univ. of Alaska Fairbanks (United States); **Steve L. Shea,** Montana State Univ. (United States); **Jintai Li,** Univ. of Alaska Fairbanks (United States); **Joseph A. Shaw,** Montana State Univ. (United States); **Michael R. Roddewig,** Univ. of Alaska Fairbanks (United States)

13472-5 • 3:40 PM - 4:10 PM
Spatially resolved, remote, real-time Raman spectroscopy *(Invited Paper)*
Author(s): **Gary W. Kamerman**, **David Kalin**, **Joshua Kalin**, **Philip Johnson**, **Paul Eadon,** FastMetrix, Inc. (United States); **Garry Freeman,** U.S. Army Space and Missile Defense Command (United States)

Thursday 17 April 2025

SESSION 2: ATMOSPHERIC AND WIND SENSING LIDARS

17 April 2025 • 8:30 AM - 9:30 AM | Osceola 2, Ballroom Level
Session Chair(s): **Gary W. Kamerman**, FastMetrix, Inc. (United States)

13472-10 • 8:30 AM - 8:50 AM
Wind lidar spatial super resolution with a lidar spectrogram noise model
Author(s): **Théo Martin**, **Laurent Mugnier**, **Matthieu Valla,** ONERA (France); **Pierre E. Allain,** Vaisala SAS (France); **David Tomline Michel,** ONERA (France)

13472-11 • 8:50 AM - 9:10 AM
Scheimpflug cameras for range-resolved observations of the atmospheric effects on laser propagation
Author(s): **Nathan D. Meraz**, **Megan Birch**, **Mary Kate Broadway,** Georgia Tech Research Institute (United States); **Ian A. Winski**, **Denly Lindeman, Katie Twitchell,** Wyant College of Optical Sciences (United States)

13472-12 • 9:10 AM - 9:30 AM
Design of a small lidar for a Mars lander to profile water vapor, aerosols, and winds
Author(s): **James B. Abshire,** NASA Goddard Space Flight Ctr. (United States), Univ. of Maryland, College Park (United States); **Daniel R. Cremons**, **Kenji Numata**, **Xiaoli Sun**, **Scott D. Guzewich, Michael D. Smith,** NASA Goddard Space Flight Ctr. (United States)

Coffee Break 9:30 AM - 10:00 AM

SESSION 3: BATHYMETRIC LIDAR

17 April 2025 • 10:00 AM - 11:00 AM | Osceola 2, Ballroom Level
Session Chair(s): **Lori A. Magruder**, The Univ. of Texas at Austin (United States)

13472-13 • 10:00 AM - 10:20 AM
532-nm frequency-modulated continuous-wave lidar development
Author(s): **Michael R. Roddewig, Jintai Li,** Univ. of Alaska Fairbanks (United States)

13472-14 • 10:20 AM - 10:40 AM
Droneborne bathymetric lidar development at the University of Alaska-Fairbanks
Author(s): **William F. Caldwell**, **Jintai Li**, **Baxter W. Bond, Michael R. Roddewig,** Univ. of Alaska Fairbanks (United States)

13472-15 • 10:40 AM - 11:00 AM
Machine-learning-assisted full waveform analysis with pre-detection averaging for bathymetric lidar
Author(s): **Nan Li**, **Martin Pfennigbauer, Roland Schwarz,** RIEGL Research Forschungsgesellschaft mbH (Austria)

SESSION 4: FOPEN LIDAR

17 April 2025 • 11:00 AM - 11:50 AM | Osceola 2, Ballroom Level
Session Chair(s): **Gary W. Kamerman**, FastMetrix, Inc. (United States)

13472-16 • 11:00 AM - 11:30 AM
Conceptualizing Geiger-mode lidar as full-waveform lidar *(Invited Paper)*
Author(s): **Carter A. Sturm,** Army Geospatial Ctr. (United States); **Ryan W. Kirkpatrick,** U.S. Army Engineer Research and Development Ctr., U.S. Army Corps of Engineers (United States)

13472-17 • 11:30 AM - 11:50 AM
Ground estimation under foliage with Geiger-mode lidar
Author(s): **Jacob Lawrence**, **David B. Kelley, Dale G. Fried,** 3DEO, Inc. (United States)

Lunch/Exhibition Break 11:50 AM - 1:20 PM

SESSION 5: 3D IMAGING LASER RADAR ADVANCES

17 April 2025 • 1:20 PM - 3:30 PM | Osceola 2, Ballroom Level
Session Chair(s): **Lori A. Magruder**, The Univ. of Texas at Austin (United States)

13472-18 • 1:20 PM - 1:50 PM
Investigation of long-range 3D imaging and range finding for ISR missions and 3D imaging for precision missile seeker guidance *(Invited Paper)*
Author(s): **Paul F. McManamon,** Exciting Technology, LLC (United States)

13472-19 • 1:50 PM - 2:10 PM
High-power nonlinear optoelectronic millimetre wave CMOS laser with photon modulated terahertz technology for advanced radars

Author(s): **James N. Pan,** Northrop Grumman Corp. (United States), American Enterprise and License Co. (United States)

13472-20 • 2:10 PM - 2:30 PM
Two-camera setup in bistatic camera LiDAR for nighttime atmospheric sensing applications
Author(s): **Meg A. Farinsky**, **Gabriel E. Garcia**, **Nimmi C. P. Sharma,** Central Connecticut State Univ. (United States); **Amin Kabir,** Univ. of The Bahamas (Bahamas); **John E. Barnes,** National Oceanic and Atmospheric Administration (United States); **George Odhiambo,** Univ. of The Bahamas (Bahamas); **Jake P. Simoes**, **Jhonjairo Zaldivar, Tessa E. Masi,** Central Connecticut State Univ. (United States)

13472-21 • 2:30 PM - 2:50 PM
Effects and conditions of mutual interference in FMCW lidars
Author(s): **Christopher R. Valenta,** Georgia Tech Research Institute (United States); **Engin Esen, Thomas K. Gaylord,** Georgia Institute of Technology (United States)

13472-22 • 2:50 PM - 3:10 PM
Improving texturing techniques for fused LiDAR images
Author(s): **Samuel Kiguthi, Scott Budge,** Utah State Univ. (United States)

13472-23 • 3:10 PM - 3:30 PM
Honeywell's high-altitude LiDAR atmospheric sensing (HALAS) technology: capabilities, markets, data, and applications for precision observations
Author(s): **Robert Mark**, **Matthew ArchMiller**, **Patrick Fletcher**, **Kaizhong Gao**, **Derrick Johnson**, **Jeffrey VanKerkhove**, **Jeffrey Klein**, **Thomas Dobbins**, **Matthew Wiebold**, **Jason Pendlum,** Honeywell Aerospace Technologies (United States); **Collin Kneubuhler,** Honeywell Aerospace (United States)

CONFERENCE 13473

Artificial Intelligence and Machine Learning for Multi-Domain Operations Applications VII

14 - 16 April 2025 | Osceola 5, Ballroom Level

Conference Chair(s): **Peter J. Schwartz,** The MITRE Corp. (United States); **Myron E. Hohil,** DEVCOM - Armaments Ctr. (United States)

Conference Co-Chair(s): **Benjamin Jensen,** Marine Corps Univ. (United States); **Brian Henz,** U.S. Dept. of Homeland Security (United States)

Program Committee: **Nathaniel D. Bastian,** U.S. Military Academy (United States); **Sean Gart,** DEVCOM Army Research Lab. (United States); **Brayden Hollis**, **Jeffrey Hudack,** Air Force Research Lab. (United States); **Amir Morcos,** U.S. Army DEVCOM Armaments Ctr. (United States); **Tien Pham,** The MITRE Corp. (United States); **Alun D. Preece,** Cardiff Univ. (United Kingdom); **Katie Rainey,** Naval Information Warfare Ctr. Pacific (United States); **Christopher R. Ratto,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States); **Danda B. Rawat,** Howard Univ. (United States); **Kelly K. D. Risko,** U.S. Army DEVCOM Aviation and Missile Center (France); **Kalyan Vaidyanathan,** BAE Systems (United States); **Michael Wolmetz,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

Monday 14 April 2025

SESSION 1: LLM APPLICATIONS

14 April 2025 • 9:00 AM - 10:00 AM | Osceola 5, Ballroom Level
Session Chair(s): **Peter J. Schwartz**, The MITRE Corp. (United States); **Benjamin Jensen**, Marine Corps Univ. (United States)

13473-1 • 9:00 AM - 9:20 AM
Optimizing LLM Decision-Making and Time-Series Analysis using DSPy
Author(s): **Aditya B. Sood,** Stanford Univ. (United States); **Himani Sood,** Boston University Chobanian and Avedisian School of Medicine (United States); **Andre Beckus,** Air Force Research Lab. - Rome (United States)

13473-2 • 9:20 AM - 9:40 AM
AI-based replication of human moral judgements: Moral proxies for multi-domain operations
Author(s): **Kimberly Glasgow, Rik Bose,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

13473-3 • 9:40 AM - 10:00 AM
Evaluation of different approaches for the function matching problem
Author(s): **Jan Bieniek**, **Innocent B Ababio**, **Mohamed Rahouti,** Fordham Univ. (United States); **Dinesh C. Verma,** IBM Thomas J. Watson Research Ctr. (United States); **Tom Sheffler,** Independent (United States)

Coffee Break 10:00 AM - 10:30 AM

SESSION 2: AI/ML APPLICATIONS I

14 April 2025 • 10:30 AM - 11:50 AM | Osceola 5, Ballroom Level
Session Chair(s): **Kelly K. D. Risko**, U.S. Army Combat Capabilities Development Command (United States)

13473-5 • 10:30 AM - 10:50 AM
A bibliometric review of machine learning applications in multi-domain operations: A decade of progress
Author(s): **Khaled Obaideen,** Univ. of Sharjah (United Arab Emirates); **Patrick Kosierb**, **Waleed Hilal,** McMaster Univ. (Canada); **Mohammad AlShabi,** Univ. of Sharjah (United Arab Emirates); **Stephen A. Gadsden,** McMaster Univ. (Canada)

13473-6 • 10:50 AM - 11:10 AM
A deep reinforcement learning approach with a parallel training scheme for kinova manipulator
Author(s): **Wen-Yu Cheng**, **Cameron Veit**, **Zhen Ni**, **Erik D. Engeberg, Xiangnan Zhong,** Florida Atlantic Univ. (United States)

13473-7 • 11:10 AM - 11:30 AM
Controller area network (CAN) data investigation for the application of battlefield energy awareness
Author(s): **Robert S. Jane,** DEVCOM Army Research Lab. (United States); **Corey James**, **Tsegaye E. Janat, Zane J. Ferrying,** U.S. Military Academy (United States)

13473-31 • 11:30 AM - 11:50 AM
Resource-efficient, self-adaptive neurosymbolic artificial intelligence for the Internet of Battlefield Things
Author(s): **John D. Beggs**, **Sean M. Coffey**, **Jared M. Murphy, Nathaniel D. Bastian,** U.S. Military Academy (United States)

Lunch Break 11:50 AM - 1:40 PM

SESSION 3: HUMAN-AI TEAMING

14 April 2025 • 1:40 PM - 3:00 PM | Osceola 5, Ballroom Level
Session Chair(s): **Michael Wolmetz**, Johns Hopkins Univ. Applied Physics Lab., LLC (United States); **Tien Pham**, The MITRE Corp. (United States)

13473-8 • 1:40 PM - 2:00 PM
Beyond human reasoning: Bridging the human-machine information gap
Author(s): **John Winder**, **Willa M. Mannering**, **Greyson Brothers**, **Anish Nayak**, **Justin J. Harsono**, **Noah Ford**, **Naveed Haghani, Thomas J. Urban,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

13473-9 • 2:00 PM - 2:20 PM
Revolutionizing OV-1 creation: Human machine teaming tools for closed environments
Author(s): **Nate Rudolph,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

13473-10 • 2:20 PM - 2:40 PM
Development of a cognitive assessment system for evaluating geospatial intelligence analysis
Author(s): **Jeffry A. Coady**, **Taylor M. Moss**, **Joseph P. Salisbury,** Riverside Research (United States); **Aaron T. Winder**, **Philip C. Desrochers**, **Howard Rafal**, **Bradly T. Stone**, **Bethany K. Bracken**, **Benjamin C. Gibson,** Charles River Analytics, Inc. (United States); **William D. Casebeer, David H. Huberdeau,** Riverside Research (United States)

13473-11 • 2:40 PM - 3:00 PM
Testbed for human-autonomy teaming (Testbed4HAT)
Author(s): **Aurora Schmidt**, **Jared Markowitz**, **Chace Ashcraft, Devin Ramsden,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 4: REASONING UNDER UNCERTAINTY

15 April 2025 • 11:00 AM - 12:00 PM | Osceola 5, Ballroom Level
Session Chair(s): **Katie Rainey**, Naval Information Warfare Ctr. Pacific (United States)

13473-12 • 11:00 AM - 11:20 AM
Enhancing AI/ML models for predicting the impact of extreme events in multi-domain operations
Author(s): **Collin Meese**, **Danielle Lee**, **Kurt Hammen, Mark Nejad,** Univ. of Delaware (United States)

13473-13 • 11:20 AM - 11:40 AM
Predicate credibility logic for artificial intelligence
Author(s): **Xinjia Chen,** Northwestern State Univ. (United States)

13473-15 • 11:40 AM - 12:00 PM
Detecting and evaluating deception with artificial intelligence assistants
Author(s): **Michael F. Czajkowski**, **Aysha S. Khan, Jinhong Guo,** Lockheed Martin Corp. (United States)

Lunch/Exhibition Break 12:00 PM - 1:50 PM

SESSION 5: ADVERSARIAL REASONING

15 April 2025 • 1:50 PM - 3:10 PM | Osceola 5, Ballroom Level
Session Chair(s): **Kalyan Vaidyanathan**, BAE Systems (United States); **Jeffrey Hudack**, Air Force Research Lab. (United States)

13473-16 • 1:50 PM - 2:10 PM
Multidomain evaluation network for threat assessment and tracking (MENTAT)
Author(s): **Christopher Cerezo Falco**, **Patrick Karmis, Timothy Kreutzfeldt,** Lockheed Martin Corp. (United States)

13473-17 • 2:10 PM - 2:30 PM
Time-series spatial predictions of UAS using hybrid machine learning
Author(s): **Randall Warren**, **Wesley N. Colley**, **Matthew Mills, Luke Bower,** Torch Technologies, Inc. (United States)

13473-18 • 2:30 PM - 2:50 PM
Applying graph neural networks for adversary system analysis
Author(s): **Jinhong K. Guo**, **Gabriel Collins**, **Zachary Wright,** Lockheed Martin Corp. (United States); **Philip Morrone,** Air Force Research Lab. (United States); **Valerie Champagne, Harleen Brar,** Lockheed Martin Corp. (United States)

13473-52 • 2:50 PM - 3:10 PM
AD-GAM: Anomaly Detection in IoT using Generative AI Models
Author(s): **Yuba R. Siwakoti,** Central Washington Univ. (United States); **Danda B. Rawat,** Howard Univ. (United States); **Sooie-Hoe Loke,** Central Washington Univ. (United States)

Coffee Break 3:10 PM - 3:40 PM

SESSION 6: DEFENSIVE OPERATIONS

15 April 2025 • 3:40 PM - 4:20 PM | Osceola 5, Ballroom Level
Session Chair(s): **Michael Wolmetz**, Johns Hopkins Univ. Applied Physics Lab., LLC (United States); **Brian J. Henz**, DEVCOM Army Research Lab. (United States)

13473-21 • 3:40 PM - 4:00 PM
A spatiotemporal data-based anomaly detection with a large language model
Author(s): **Taehee Kim**, **JongSik Ahn**, **Tae-Young Lee, Byungin Choi,** Hanwha Systems Co., Ltd. (Korea, Republic of)

13473-22 • 4:00 PM - 4:20 PM
Scalable generative AI induced disinformation in multi-lingual platforms
Author(s): **Veronika E. Makowski**, **Yungjun Yoo**, **Samuel Nathanson**, **Joseph S. Lee, Lanier Watkins,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level

Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13473-43 • 5:30 PM - 7:00 PM
Neural operators for surrogate modeling in complex dynamic systems
Author(s): **Yuandi Wu**, **Brett Sicard**, **Patrick Kosierb**, **Thomas French**, **Alexandre M Leroux, Stephen A. Gadsden,** McMaster Univ. (Canada)

Wednesday 16 April 2025

SESSION 7: MISSION PLANNING

16 April 2025 • 9:00 AM - 10:00 AM | Osceola 5, Ballroom Level
Session Chair(s): **Brayden Hollis**, Air Force Research Lab. (United States); **Amir Morcos**, U.S. Army DEVCOM Armaments Ctr. (United States)

13473-24 • 9:00 AM - 9:20 AM
Large-scale agent decision making in joint all-domain operational wargaming
Author(s): **Jake Giguere, Jaden Kitchen-Lipski,** Air Force Research Lab. (United States)

13473-26 • 9:20 AM - 9:40 AM
AI-assisted flight plan generation and verification
Author(s): **Kalyan Vaidyanathan**, **Ty Danet**, **TriVi Tran, Yen Luu,** BAE Systems (United States)

13473-27 • 9:40 AM - 10:00 AM
Integration of a new layer normalization process into federated reinforcement learning for environments with heterogeneous attribute spaces
Author(s): **Yiran Pang**, **Zhen Ni, Xiangnan Zhong,** Florida Atlantic Univ. (United States)

Coffee Break 10:00 AM - 10:30 AM

SESSION 11: AI/ML APPLICATIONS II

16 April 2025 • 10:30 AM - 11:50 AM | Osceola 5, Ballroom Level
Session Chair(s): **Christopher R. Ratto**, Johns Hopkins Univ. Applied Physics Lab., LLC (United States); **Myron E. Hohil**, DEVCOM - Armaments Ctr. (United States)

13473-39 • 10:30 AM - 10:50 AM
ML-aided channel information prediction for autonomous UAV networks
Author(s): **Min Song**, **Moh K. Hasan,** Stevens Institute of Technology (United States); **Noor Ahmed,** Air Force Research Lab. (United States)

13473-40 • 10:50 AM - 11:10 AM
Beam Pattern Optimization for Conformal Antennas Using Reinforcement Learning and Self-Attention Mechanism
Author(s): **Peter Taiwo,** Morgan State Univ. (United States); **David Oyediran,** Naval Surface Warfare Ctr. Indian Head Div. (United States)

13473-41 • 11:10 AM - 11:30 AM
Application of distil-Whisper for transcription of aviation communication
Author(s): **Shokoufeh Mirzaei,** California State Polytechnic Univ., Pomona (United States); **Jesus Arzate,** U.S. Air Force (United States); **Yukti Vijay,** Skyryse, Inc. (United States)

13473-42 • 11:30 AM - 11:50 AM
Shooter localization using shock waves and deep learning classification networks
Author(s): **Macarena Varela**, **Ravali Nalla, Wulf-Dieter Wirth,** Fraunhofer-Institut für Kommunikation, Informationsverarbeitung und Ergonomie FKIE (Germany)

Lunch/Exhibition Break 11:50 AM - 2:00 PM

SESSION 9: SYNTHETIC DATA GENERATION

16 April 2025 • 2:00 PM - 2:40 PM | Osceola 5, Ballroom Level
Session Chair(s): **Amir Morcos**, U.S. Army DEVCOM Armaments Ctr. (United States); **Danda B. Rawat**, Howard Univ. (United States); **Yuba Siwakoti**, Central Washington Univ. (United States)

13473-32 • 2:00 PM - 2:20 PM
Radio frequency signal generation using denoising diffusion implicit models
Author(s): **Matthew Judah**, **Addison Nute, Scott Kuzdeba,** BAE Systems (United States)

13473-33 • 2:20 PM - 2:40 PM
Spatial intelligence-driven synthetic networks for multi-domain operations
Author(s): **Kurt Hammen**, **Collin Meese**, **Danielle Lee, Mark Nejad,** Univ. of Delaware (United States)

Coffee Break 2:40 PM - 3:10 PM

SESSION 10: COMPUTER VISION

16 April 2025 • 3:10 PM - 4:30 PM | Osceola 5, Ballroom Level
Session Chair(s): **Katie Rainey**, Naval Information Warfare Ctr. Pacific (United States); **Christopher R. Ratto**, Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

13473-35 • 3:10 PM - 3:30 PM
Transform low resolution, low-quality satellite images into high-resolution, high-quality satellite images
Author(s): **Bingcai Zhang,** BAE Systems (United States)

13473-36 • 3:30 PM - 3:50 PM
Enhancing vessel detection in satellite imagery: leveraging game engines and synthetic data for naval applications
Author(s): **Sean Kim,** U.S. Naval Research Lab. (United States)

13473-37 • 3:50 PM - 4:10 PM
Detecting electro-optical sensor anomalies in maritime satellite imagery using classification model latent space embeddings
Author(s): **John G. Warner,** U.S. Naval Research Lab. (United States); **Vishal Patel,** Johns Hopkins University (United States); **Sean D Kim, Quinton T Davidson,** U.S. Naval Research Lab. (United States)

13473-38 • 4:10 PM - 4:30 PM
Characterizing vision language model use towards zero-shot maritime, satellite imagery classification
Author(s): **John G. Warner,** U.S. Naval Research Lab. (United States); **Vishal Patel,** Johns Hopkins University (United States)

CONFERENCE 13474

Autonomous Systems: Sensors, Processing, and Security for Ground, Air, Sea, and Space Vehicles and Infrastructure 2025

14 - 15 April 2025 | Osceola 6, Ballroom Level

Conference Chair(s): **Michael C. Dudzik,** IQM Research Institute (United States); **Stephen M. Jameson,** BAE Systems (United States); **Theresa J. Axenson,** (United States)

Program Committee: **John E. Ball,** Mississippi State Univ. (United States); **Jeremy P. Bos,** Michigan Technological Univ. (United States); **Andrew Dallas,** National Advanced Mobility Consortium (United States); **Jason M. Eichenholz,** Luminar Technologies, Inc. (United States); **Paul F. McManamon,** Exciting Technology, LLC (United States)

Monday 14 April 2025

OPENING REMARKS

14 April 2025 • 9:00 AM - 9:10 AM | Osceola 6, Ballroom Level
Remarks by the conference chairs.

SESSION 1: SENSING, PROCESSING, AND SAFETY FOR UNMANNED GROUND VEHICLES I

14 April 2025 • 9:10 AM - 10:30 AM | Osceola 6, Ballroom Level
Session Chair(s): **Michael C. Dudzik**, IQM Research Institute (United States)

13474-1 • 9:10 AM - 9:30 AM
Robust Traffic Light, Road Sign, and Lane Marking Recognition Including Flashing Red and Yellow Lights Using Deep Learning Techniques for Intersection Navigation
Author(s): **Laith Bani Khaled**, **Mahfuzur Rahman, John E. Ball,** Mississippi State Univ. (United States)

13474-2 • 9:30 AM - 9:50 AM
New tendencies in LiDAR technology for autonomous vehicles and other applications
Author(s): **Valeri Saveliev,** Integrated Quantum Photonics (United States)

13474-3 • 9:50 AM - 10:10 AM
Resilient autonomous driving on the edge
Author(s): **Daniel Aaron,** Two Six Technologies, Inc. (United States)

13474-4 • 10:10 AM - 10:30 AM
CAVS semantic segmentation dataset for off-road autonomous vehicles
Author(s): **Lalitha Dabbiru,** Mississippi State Univ. (United States); **Suvash Sharma,** ObjectVideo, Inc. (United States); **Kofi Ennin**, **Christopher T. Goodin**, **Christopher R. Hudson,** Mississippi State Univ. (United States); **Matthew Doude,** Leidos, Inc. (United States); **Daniel W. Carruth, John E. Ball,** Mississippi State Univ. (United States)

Coffee Break 10:30 AM - 11:00 AM

SESSION 4: SECURE OPERATION OF AUTONOMOUS SYSTEMS

14 April 2025 • 11:00 AM - 12:00 PM | Osceola 6, Ballroom Level
Session Chair(s): **Michael C. Dudzik**, IQM Research Institute (United States)

13474-6 • 11:00 AM - 11:20 AM
V2I communication of autonomous vehicles with traffic light infrastructures of multiple intersections to optimize vehicle speed for

energy efficiency
Author(s): **Mahfuzur Rahman**, **Laith Bani Khaled**, **Iffat Ara Ebu, John E. Ball,** Mississippi State Univ. (United States)

13474-7 • 11:20 AM - 11:40 AM
A virtual cyber-physical test range for evaluating the cybersecurity of autonomous systems
Author(s): **Christopher T. Goodin**, **Daniel W. Carruth**, **Sara Fuller**, **Kaneesha K. Moore**, **Benjamin T. Skinner,** Mississippi State Univ. (United States); **Carl Mueller,** Circadence Corp. (United States)

13474-9 • 11:40 AM - 12:00 PM
Leveraging software-defined radio and adversarial learning to circumvent specific emitter identification-based security
Author(s): **Joshua H. Tyler**, **Colin Keeter, Donald R. Reising,** The Univ. of Tennessee at Chattanooga (United States)

Lunch Break 12:00 PM - 1:30 PM

SESSION 2: SENSING, PROCESSING, AND SAFETY FOR UNMANNED GROUND VEHICLES II

14 April 2025 • 1:30 PM - 2:20 PM | Osceola 6, Ballroom Level
Session Chair(s): **Michael C. Dudzik**, IQM Research Institute (United States)

13474-200 • 1:30 PM - 2:00 PM
The National Advanced Mobility Consortium: Overview, projects, and opportunities *(Invited Paper)*
Author(s): **Warren Sponsler,** National Advanced Mobility Consortium (United States)

13474-5 • 2:00 PM - 2:20 PM
Using V2V to implement cooperative-adaptive cruise control and testing in MIL and HIL environment
Author(s): **Jacob Roberts**, **Samuel Ball**, **Fahmida Islam, John E. Ball,** Mississippi State Univ. (United States)

SESSION 5: NOVEL ALGORITHMIC TECHNIQUES FOR CONTROL OF AUTONOMOUS SYSTEMS

14 April 2025 • 2:20 PM - 2:40 PM | Osceola 6, Ballroom Level
Session Chair(s): **Michael C. Dudzik**, IQM Research Institute (United States)

13474-11 • 2:20 PM - 2:40 PM
Earthling logic for autonomous systems
Author(s): **Xinjia Chen,** Northwestern State Univ. (United States)

Coffee Break 2:40 PM - 3:10 PM

SESSION 6: NOVEL SENSOR PROCESSING TECHNIQUES FOR AUTONOMOUS SYSTEMS I

14 April 2025 • 3:10 PM - 3:50 PM | Osceola 6, Ballroom Level
Session Chair(s): **Michael C. Dudzik**, IQM Research Institute (United States)

13474-15 • 3:10 PM - 3:30 PM
Proactive Prevention of Bad Data Propagation in Autonomous Systems
Author(s): **Mohamed Salem**, **Kevin Li,** Michigan Technological Univ. (United States); **Stephen L Taylor**, **Timothy O Murphy,** US Naval Surface Warfare Center (United States); **Steven Senczyszyn, Timothy C Havens,** Michigan Technological Univ. (United States)

13474-16 • 3:30 PM - 3:50 PM
Evaluation of 3D ROS-based simultaneous localization and mapping under noisy conditions for uncrewed surface vessels navigation
Author(s): **Kevin Li**, **Mohamed Salem,** Michigan Technological Univ. (United States); **Stephen L Taylor**, **Timothy O Murphy,** US Naval Surface Warfare Center (United States); **Steven Senczyszyn, Timothy C Havens,** Michigan Technological Univ. (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

INTRODUCTORY REMARKS

15 April 2025 • 11:00 AM - 11:10 AM | Osceola 6, Ballroom Level
Remarks by conference chair Mike Dudzik.

SESSION 7: NOVEL SENSOR PROCESSING TECHNIQUES FOR AUTONOMOUS SYSTEMS II

15 April 2025 • 11:10 AM - 12:10 PM | Osceola 6, Ballroom Level
Session Chair(s): **Michael C. Dudzik**, IQM Research Institute (United States)

13474-18 • 11:10 AM - 11:30 AM
Phased array acoustic sensing for sound localization using beamforming and principal component analysis
Author(s): **Kevin McKenzie**, **Thomas P. Watson, Eddie L. Jacobs,** The Univ. of Memphis (United States)

13474-19 • 11:30 AM - 11:50 AM
UAV navigation for stream data collection through tree canopies using dynamic motion primitives
Author(s): **Seyedeh Parisa Dajkhosh**, **Delmi G. Ortega**, **Mohammadreza Davoodi, Eddie L. Jacobs,** The Univ. of Memphis (United States)

13474-20 • 11:50 AM - 12:10 PM
Pretraining AI models for autonomous detection of subsurface ferrous objects in magnetometry surveys
Author(s): **Nathan Redmond**, **Zachary Adler**, **Patrick Neal**, **Collin Hays**, **Brian M. Robinson,** Torch Technologies, Inc. (United States); **Robert A. Diltz,** Air Force Civil Engineer Ctr. (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13474-21 • 5:30 PM - 7:00 PM

ESS: Enhancing semantic segmentation for autonomous vehicles

Author(s): **Woretaw Teshome Molla**, **Wang Jiahao**, **Rao Yunbo,** Univ. of Electronic Science and Technology of China (China); **Hao Chen,** Intelligent Manufacturing and Information Technology (China); **Nigus Dawit Bekalu, Mulugojam Negash Abebe,** Univ. of Electronic Science and Technology of China (China)

13474-22 • 5:30 PM - 7:00 PM

An adaptive Monte Carlo method for evaluating reliability with guaranteed accuracy and confidence

Author(s): **Xinjia Chen,** Northwestern State Univ. (United States); **Hsiao Chun Wu,** Louisiana State Univ. (United States); **Shih Yu Chang,** San José State Univ. (United States); **Bryan Chen,** Louisiana School for Math, Science, and the Arts (United States)

CONFERENCE 13475

Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping X

14 - 15 April 2025 | Tallahassee 3, Ballroom Level

Conference Chair(s): **J. Alex Thomasson,** Mississippi State Univ. (United States); **Christoph Bauer,** KWS SAAT SE & Co. KGaA (Germany)

Program Committee: **Subodh Bhandari,** California State Polytechnic Univ., Pomona (United States); **Yufeng Ge,** Univ. of Nebraska-Lincoln (United States); **Xiongzhe Han,** Kangwon National Univ. (Korea, Republic of); **Seth C. Murray,** Texas A&M AgriLife Research (United States); **Carl Salvaggio,** Rochester Institute of Technology (United States); **Michael P. Sama,** Univ. of Kentucky (United States); **Sindhuja Sankaran,** Washington State Univ. (United States); **Ajay Sharda,** Kansas State Univ. (United States); **Yeyin Shi,** Univ. of Nebraska-Lincoln (United States); **Alfonso F. Torres-Rua,** Utah State Univ. (United States)

Monday 14 April 2025

SESSION 1: ACCURATE UAV-BASED SENSING FOR PHENOTYPING AND PRECISION AGRICULTURE

14 April 2025 • 8:00 AM - 10:10 AM | Tallahassee 3, Ballroom Level
Session Chair(s): **J. Alex Thomasson**, Mississippi State Univ. (United States)
Introduction 8:00 - 8:10 AM

13475-1 • 8:10 AM - 8:30 AM
Radiometric and modified RossThick-LiSparse BRDF correction for low-altitude UAV data at varying solar-sensor geometries for time-series analysis
Author(s): **Suraj A. Yadav**, **Nuwan K. Wijewardane**, **Xin Zhang, Daniel McCraine,** Mississippi State Univ. (United States)

13475-2 • 8:30 AM - 9:10 AM
Longwave thermal infrared atmospheric correction using in situ scene elements - The multiple altitude technique revisited for small unmanned aircraft systems (sUAS) (Keynote Presentation) *(Invited Paper)*
Author(s): **Carl Salvaggio**, **Danny P. Klosinski**, **Robert A. Mancini**, **Ryan B. McDonald**, **Parker M. Mei**, **Karla S. van Aardt**, **Rehman S. Eon, Timothy D. Bauch,** Rochester Institute of Technology (United States)

13475-3 • 9:10 AM - 9:30 AM
Simulated real-time processing and machine learning on GNSS-R data for land-water segmentation in wetlands
Author(s): **Luke Redwine**, **Jenny Du, John Ball,** Mississippi State Univ. (United States)

13475-34 • 9:30 AM - 9:50 AM
Machine-learning techniques for the detection of powdery mildew in vineyards using aerial and ground imageries
Author(s): **Subodh Bhandari**, **Amar Raheja**, **Michael D. Acosta**, **Mahakbhai S. Patel, Cristobal C. Gonzalez,** California State Polytechnic Univ., Pomona (United States)

13475-5 • 9:50 AM - 10:10 AM
Automated tool for rapid data analytics of remotely sensed data for phenotypic and precision agriculture applications
Author(s): **Aashvi Dua**, **Ajay Sharda**, **William Schapaugh, Rene Hessel,** Kansas State Univ. (United States)

Coffee Break 10:10 AM - 10:40 AM

SESSION 2: UAVS AND UGVS FOR PHENOTYPING AND PRECISION AGRICULTURE

14 April 2025 • 10:40 AM - 12:20 PM | Tallahassee 3, Ballroom Level
Session Chair(s): **Christoph Bauer**, KWS SAAT SE & Co. KGaA (Germany)

13475-6 • 10:40 AM - 11:00 AM

Improving semantic segmentation through task adaptation for UAV hyperspectral agricultural imagery
Author(s): **Mazharul Hossain**, **Aaron L. Robinson**, **Lan Wang, Chrysanthe Preza,** The Univ. of Memphis (United States)

13475-7 • 11:00 AM - 11:20 AM
UAV-based sensing systems for agricultural optimization: focus on phenotyping and crop monitoring
Author(s): **Khaled Obaideen,** Univ. of Sharjah (United Arab Emirates); **Thomas French**, **Waleed Hilal,** McMaster Univ. (Canada); **Mohammad AlShabi,** Univ. of Sharjah (United Arab Emirates); **S. Andrew Gadsden,** McMaster Univ. (Canada)

13475-8 • 11:20 AM - 11:40 AM
Chimaera: A tethered UAV enhancement to proximal sensing carts and UGVs
Author(s): **Joseph Perry**, **Eddie L. Jacobs, Thomas Watson,** The Univ. of Memphis (United States)

13475-9 • 11:40 AM - 12:00 PM
Irradiance source comparison for FLD-based solar-induced fluorescence (SIF) retrieval using hyperspectral imagery
Author(s): **Angelin R. Favorito**, **Thomas P. Watson, Eddie L. Jacobs,**The Univ. of Memphis (United States)

13475-10 • 12:00 PM - 12:20 PM
A comparative study of 3D reconstruction techniques for plant phenotyping: From point cloud, neural radiance fields (NeRF), to 3D Gaussian splatting (3DGS)
Author(s): **Jiajia Li**, **Xinda Qi,** Michigan State Univ. (United States); **Seyed H. Nabaei,** Univ. of Virginia (United States); **Dong Chen**, **Xin Zhang, Zhaojian Li,** Mississippi State Univ. (United States)

Lunch Break 12:20 PM - 1:50 PM

SESSION 3: UGV-BASED SENSING FOR PHENOTYPING AND PRECISION AGRICULTURE I

14 April 2025 • 1:50 PM - 3:10 PM | Tallahassee 3, Ballroom Level
Session Chair(s): **J. Alex Thomasson**, Mississippi State Univ. (United States)

13475-11 • 1:50 PM - 2:10 PM
Automated synthetic maize field for machine learning model development
Author(s): **Michael A. Mardikes**, **John T. Evans, Nathan Sprague,** Purdue Univ. (United States)

13475-12 • 2:10 PM - 2:30 PM
Corn Stalk Diameter Estimation Using Deep Learning
Author(s): **Nathan Sprague, Michael A. Mardikes,** Purdue Univ. (United States)

13475-13 • 2:30 PM - 2:50 PM
Testing DRIP-GPS: a simulation study on real-time precision irrigation with GNSS-R
Author(s): **Sriman Bidhan Baray**, **Md Mehedi Farhad**, **George Vellidis, Mehmet Kurum,** The Univ. of Georgia (United States)

13475-14 • 2:50 PM - 3:10 PM
PhenAI-bot: High-throughput 3D crop phenotyping of soybean (Glycine max) in greenhouse settings
Author(s): **Ivan Perez Olivera,** South Dakota State Univ. (United States); **Swarnabha Roy,** Texas A&M Univ. (United States); **Pappu K. Yadav**, **Amee Parmar**, **Rishik Aggarwal, Inayat Rasool,** South Dakota State Univ. (United States)

Coffee Break 3:10 PM - 3:40 PM

SESSION 4: UGV-BASED SENSING FOR PHENOTYPING AND PRECISION AGRICULTURE II

14 April 2025 • 3:40 PM - 5:10 PM | Tallahassee 3, Ballroom Level
Session Chair(s): **Christoph Bauer**, KWS SAAT SE & Co. KGaA (Germany)

13475-31 • 3:40 PM - 4:10 PM
Enhanced AI-driven sensing and analytics platform for precision orchard management *(Invited Paper)*
Author(s): **Yiannis Ampatzidis**, **Shiyu Liu**, **Hengyue Guan, Antonio A. D. C. Neto,** Univ. of Florida (United States)

13475-16 • 4:10 PM - 4:30 PM
Investigating feature types for automated multiclass citrus peel disease detection
Author(s): **Quentin Frederick**, **Thomas Burks**, **Adam Watson,** Univ. of Florida (United States); **Mark Ritenour,** Indian River Research and Education Ctr. (United States); **John Schueller,** Univ. of Florida (United States); **Yiannis Ampatzidis,** Southwest Florida Research and Education Ctr. (United States); **Md Zafar Iqbal**, **Satya Aakash Chowdary Obellaneni,** Univ. of Florida (United States); **Ketan Shende,** Indian River Research and Education Ctr. (United States); **Kyusuk You,** Agricultural Research Service (United States)

13475-17 • 4:30 PM - 4:50 PM
Initial prototyping of a low-cost unoccupied ground vehicle platform for crop problem risk and severity mapping in agricultural fields
Author(s): **Chijioke Leonard Nkwocha, Abhilash K. Chandel,** Virginia Polytechnic Institute and State Univ. (United States)

13475-18 • 4:50 PM - 5:10 PM
AI-driven computer vision for early detection of sudden death syndrome in soybean using portable hyperspectral imaging system
Author(s): **Rishik Aggarwal**, **Pappu K. Yadav**, **Ali M. Nafchi**, **Young Chang**, **Shyam Solanki**, **Ravi Mural**, **David Karki**, **Thomas Burks, Jianwei Qin,** South Dakota State Univ. (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 5: UGV-BASED SENSING FOR PHENOTYPING AND PRECISION AGRICULTURE III

15 April 2025 • 11:00 AM - 12:40 PM | Tallahassee 3, Ballroom Level
Session Chair(s): **J. Alex Thomasson**, Mississippi State Univ. (United States)

13475-19 • 11:00 AM - 11:20 AM
Harvest-Bot: precision harvesting of pepper (*Capsicum annuum L.*) varieties in a greenhouse
Author(s): **Swarnabha Roy,** Texas A&M Univ. (United States); **Amee Parmar**, **Rishik Aggarwal,** South Dakota State Univ. (United States); **Stavros Kalafatis,** Texas A&M Univ. (United States); **Pappu K. Yadav,** South Dakota State Univ. (United States)

13475-20 • 11:20 AM - 11:40 AM
PyBullet for kinematic and dynamic simulations of an agricultural robot for corn stem disease detection
Author(s): **Inayat Rasool**, **Iván P. Olivera**, **Amee Parmar**, **Young Chang,** South Dakota State Univ. (United States); **Thomas Burks,** Univ. of Florida (United States); **Pappu K. Yadav,** South Dakota State Univ. (United States)

13475-21 • 11:40 AM - 12:00 PM
AI driven computer vision for detection and pose estimation of chile peppers (Capsicum annuum L.) for a robotic harvester
Author(s): **Amee Parmar**, **Inayat Rasool, Pappu K. Yadav,** South Dakota State Univ. (United States)

13475-22 • 12:00 PM - 12:20 PM
Estimation of nitrogen status in corn leaves using hyperspectral imaging and convolutional neural networks
Author(s): **Rishik Aggarwal**, **Amee Parmar**, **Thomas Burks,** South Dakota State Univ. (United States); **Moon Kim**, **Jianwei Qin,** Agricultural Research Service (United States); **Pappu K. Yadav,** South Dakota State Univ. (United States); **Swarnabha Roy,** Texas A&M Univ. (United States); **David Clay, Graig Reicks,** South Dakota State Univ. (United States)

13475-23 • 12:20 PM - 12:40 PM
PhenAI-Bot: precision 3D crop phenotyping of pepper (*Capsicum annuum L.*) varieties in a greenhouse
Author(s): **Swarnabha Roy,** Texas A&M Univ. (United States); **Amee Parmar**, **Rishik Aggarwal,** South Dakota State Univ. (United States); **Stavros Kalafatis,** Texas A&M Univ. (United States); **Pappu K. Yadav,** South Dakota State Univ. (United States)

Lunch/Exhibition Break 12:40 PM - 2:10 PM

SESSION 6: APPLICATIONS OF UAV-BASED SENSING FOR PHENOTYPING AND PRECISION AGRICULTURE

15 April 2025 • 2:10 PM - 3:30 PM | Tallahassee 3, Ballroom Level
Session Chair(s): **Christoph Bauer**, KWS SAAT SE & Co. KGaA (Germany)

13475-24 • 2:10 PM - 2:30 PM
Comparative analysis of feature selection techniques to identify a set of optimal features for crop yield estimation using UAS-based multi-sensor data
Author(s): **Mohammad Abdus Shahid Rafi**, **Volkan Senyurek**, **John E. Ball, Ali C. Gurbuz,** Mississippi State Univ. (United States)

13475-25 • 2:30 PM - 2:50 PM
Leveraging stacked generalization for peanut maturity mapping using aerial multispectral imagery and growing degree days
Author(s): **Sathish Raymond Emmanuel Sahayaraj**, **Abhilash K. Chandel**, **Maria Balota**, **Matthew Chappell, Venkat Sridhar,** Virginia Polytechnic Institute and State Univ. (United States)

13475-26 • 2:50 PM - 3:10 PM
Machine learning models to detect strawberry plant health from UAVs for real-time applications
Author(s): **Subodh Bhandari**, **Amar Raheja**, **Jahin Mahbub, Cristobal C. Gonzalez,** California State Polytechnic Univ., Pomona (United States)

13475-27 • 3:10 PM - 3:30 PM
Faba bean crop plant identification using aerial multispectral imagery and convolutional neural network-based deep learning models
Author(s): **Pius Jjagwe**, **Abhilash K. Chandel**, **Maria Balota, Rahul Raman,** Virginia Polytechnic Institute and State Univ. (United States)

Coffee Break 3:30 PM - 4:00 PM

CORPORATE PANEL DISCUSSION

15 April 2025 • 4:00 PM - 5:30 PM | Tallahassee 3, Ballroom Level
Moderators and panelists to be announced.

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13475-30 • 5:30 PM - 7:00 PM
Early detection of broomrape in tomato farms using satellite imagery and time-series analysis
Author(s): **Mohammadreza Narimani**, **Alireza Pourreza**, **Mohsen B. Mesgaran**, **Ali Moghimi**, **Hamid Jafarbiglu, Parastoo Farajpoor,** Univ. of California, Davis (United States)

13475-32 • 5:30 PM - 7:00 PM
Leaf spectral reflectance prediction using multihead attention neural networks
Author(s): **Parastoo Farajpoor**, **Alireza Pourreza**, **Matthew W. Fidelibus**, **Mohammadreza Narimani,** Univ. of California, Davis (United States); **Ashraf El-Kereamy,** Univ. of California, Riverside (United States)

13475-33 • 5:30 PM - 7:00 PM
High-Throughput Phenotyping of Poplar Trees through Arial LiDAR Data
Author(s): **Hamid Jafarbiglu**, **Alireza Pourreza**, **Mohammadreza Narimani**, **Jack Bailey-Bale, Gail Taylor,** Univ. of California, Davis (United States)

CONFERENCE 13476

Assurance and Security for AI-enabled Systems 2025

14 - 15 April 2025 | Osceola 4, Ballroom Level

Conference Chair(s): **Joshua D. Harguess,** Cranium AI (United States); **Nathaniel D. Bastian,** U.S. Military Academy (United States); **Teresa L. Pace,** L3Harris Technologies, Inc. (United States)

Program Committee: **Salman Asif,** Univ. of California, Riverside (United States); **Jonathan B. Elliot,** US Dept. of Defense CDAO (United States); **Myron E. Hohil,** DEVCOM - Armaments Ctr. (United States); **Brian Jalaian,** University of West Florida, Florida Institute for Human and Machine Cognition (United States); **Tien Pham,** The MITRE Corp. (United States); **Gautam K. Vallabha,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States); **Dinesh C. Verma,** IBM Thomas J. Watson Research Ctr. (United States); **Chris M. Ward,** Cranium AI (United States); **Brian Woolley,** MITRE Corp. (United States)

Monday 14 April 2025

WELCOME AND OPENING REMARKS

14 April 2025 • 9:00 AM - 9:10 AM | Osceola 4, Ballroom Level
Session Chair(s): **Joshua D. Harguess**, Cranium AI, Inc. (United States)
Join us for the welcome and opening remarks.

SESSION 1: KEYNOTE SESSION

14 April 2025 • 9:10 AM - 9:50 AM | Osceola 4, Ballroom Level
Session Chair(s): **Joshua D. Harguess**, Cranium AI, Inc. (United States)

13476-200 • 9:10 AM - 9:50 AM
Operational AI red-teaming: gaps and opportunities in the DoD (Keynote Presentation)
Author(s): **Nathaniel D. Bastian,** U.S. Military Academy (United States)

SESSION 2: AI ASSURANCE

14 April 2025 • 9:50 AM - 10:30 AM | Osceola 4, Ballroom Level
Session Chair(s): **Nathaniel D. Bastian**, U.S. Military Academy (United States)

13476-3 • 9:50 AM - 10:10 AM
Explaining model robustness: combining saliency maps and natural robustness testing using XAITK and NRTK
Author(s): **Alexander Lynch**, **Bharadwaj Ravichandran**, **Brandon Richard Webster**, **Emily Veenhuis**, **Stephen Crowell**, **Roddy Collins,** Kitware, Inc. (United States); **Austin Whitesell,** The MITRE Corp. (United States); **Anthony Hoogs,** Kitware (United States); **Brian Hu,** Kitware, Inc. (United States)

13476-25 • 10:10 AM - 10:30 AM
Patterns for combining large language models with knowledge bases to improve assurance, performance and reliability of AI solutions
Author(s): **Dinesh C. Verma**, **Pawan Chowdhary**, **David Beymer**, **Swanand R. Kadhe**, **Jon Lenchner, Shiqiang Wang,** IBM Thomas J. Watson Research Ctr. (United States)

Coffee Break 10:30 AM - 11:00 AM

SESSION 3: CYBERSECURITY

14 April 2025 • 11:00 AM - 12:00 PM | Osceola 4, Ballroom Level
Session Chair(s): **Joshua D. Harguess**, Cranium AI, Inc. (United States)

13476-5 • 11:00 AM - 11:20 AM
Authentic Key Agreement Scheme for Blockchain-based Smart Grid Applications

Author(s): **Senthil Kumar Jagatheesaperumal**, **Dhanupriyan Pothiraja**, **Satheesh Kumaresan,** Mepco Schlenk Engineering College, Sivakasi (India); **Mohamed Rahouti,** Fordham Univ. (United States); **Hamza Drid,** University of Batna 2 (Algeria); **Khaled Hamouid,** Université Gustave Eiffel (France)

13476-6 • 11:20 AM - 11:40 AM
Unified Multi-Model Fusion for Precision Defense Against Evasive Denial-of-Service Attacks
Author(s): **Evans Owusu**, **Mariyam Mapkar**, **Mohamed Rahouti**, **D. Frank Hsu,** Fordham Univ. (United States); **Christina Schweikert,** St. John's Univ. (United States); **Dinesh C. Verma,** IBM Corp. (United States)

13476-24 • 11:40 AM - 12:00 PM
Security design for NLIP: a universal protocol for AI-enabled systems
Author(s): **Sanjay Aiyagari,** Red Hat (United States); **Elisa Bertino,** Purdue Univ. (United States); **Jan Bieniek,** Fordham Univ. (United States); **Yan-Ming Chiou,** SRI International (United States); **Raj Dodhiawala,** Consultant (United States); **Sean Hughes,** ServiceNow (United States); **Sugih Jamin,** Univ. of Michigan (United States); **Ashish Kundu,** Cisco Systems, Inc. (United States); **Jon Lenchner,** IBM Thomas J. Watson Research Ctr. (United States); **Matthew L Mauriello,** Univ. of Delaware (United States); **Abhay Ratnaparakhi,** IBM Corp. (United States); **Mohamed Rahouti,** Fordham Univ. (United States); **Tom Sheffler,** Consultant (United States); **Chien-Chung Shen,** Univ. of Delaware (United States); **Dinesh C. Verma,** IBM Thomas J. Watson Research Ctr. (United States); **Jinjun Xiong,** University at Buffalo (United States); **Luyi Xing,** Indiana University (United States); **Wenpeng Yen,** Pennsylvania State University (United States); **Hasan Zengin,** Univ. of Michigan (United States)

Lunch Break 12:00 PM - 1:30 PM

SESSION 4: AI RED TEAMING

14 April 2025 • 1:30 PM - 2:50 PM | Osceola 4, Ballroom Level
Session Chair(s): **Nathaniel D. Bastian**, U.S. Military Academy (United States)

13476-8 • 1:30 PM - 1:50 PM
How private are your chat adapters? Evaluating the privacy of LoRA fine-tuned large language models with membership inference attacks
Author(s): **Nico A. Manzonelli,** U.S. Army (United States); **Sean M. Coffey, Nathaniel D. Bastian,** U.S. Military Academy (United States)

13476-10 • 1:50 PM - 2:10 PM
Prompt Engineering for Detecting Phishing
Author(s): **Darrell L. Young**, **Mitchell A. Thornton, Eric C. Larson,** Southern Methodist Univ. (United States)

13476-11 • 2:10 PM - 2:30 PM
Comprehensive Threat Modeling for RAG Systems: Defending Against Emerging Adversarial TTPs
Author(s): **Chris M. Ward**, **Josh Harguess, Mike Tan,** Cranium AI, Inc. (United States)

13476-12 • 2:30 PM - 2:50 PM
Offensive Security for AI Systems: Proactive Threat Simulation and Defense
Author(s): **Chris M. Ward**, **Josh Harguess, Mike Tan,** Cranium AI, Inc. (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

OPENING REMARKS

15 April 2025 • 11:00 AM - 11:10 AM | Osceola 4, Ballroom Level
Session Chair(s): **Teresa L. Pace**, L3Harris Technologies, Inc. (United States)
Join us for the chair opening remarks.

SESSION 5: AI GOVERNANCE I

15 April 2025 • 11:10 AM - 11:50 AM | Osceola 4, Ballroom Level
Session Chair(s): **Nathaniel D. Bastian**, U.S. Military Academy (United States)

13476-14 • 11:10 AM - 11:30 AM
A Framework for the Assurance of AI-Enabled Systems
Author(s): **Ariel Kapusta,** The MITRE Corp. (United States); **David Jin**, **Peter Teague**, **Robert Houston**, **Jonathon Elliott**, **Grace Y Park,** U.S. Dept. of Defense (United States); **Shelby S Holdren,** John Hopkins University Applied Physics Laboratory (United States)

13476-15 • 11:30 AM - 11:50 AM
Securing the Future of AI: A Holistic Approach to Trust and Robustness
Author(s): **Mathews Thomas,** IBM Corp. (United States); **Utpal Mangla,** IBM Corp. (Canada); **Sourav Banerjee**, **Vinod Chavan, Srinivas Tummalapenta,** IBM Corp. (United States)

Lunch/Exhibition Break 11:50 AM - 2:00 PM

SESSION 6: AI AND DATA ASSURANCE

15 April 2025 • 2:00 PM - 3:20 PM | Osceola 4, Ballroom Level
Session Chair(s): **Joshua D. Harguess**, Cranium AI, Inc. (United States)

13476-17 • 2:00 PM - 2:20 PM
Human-Machine Teaming and AI Assurance and Security
Author(s): **Jennifer Sierchio**, **Jeff Druce**, **Sean Guarino**, **Stephanie Kane, James Niehaus,** Charles River Analytics, Inc. (United States)

13476-19 • 2:20 PM - 2:40 PM
Initial Measurement of Data Quality
Author(s): **Mitchell Kinney,** The MITRE Corp. (United States)

13476-20 • 2:40 PM - 3:00 PM
DataEval - Enhancing end-to-end AI development through comprehensive data analysis
Author(s): **Jonathan Christian**, **Ryan Wood,** Applied Research in Acoustics LLC (United States); **Thayer Fisher,** ARiA (United States); **Robert Jullens,** Applied Research in Acoustics LLC (United States); **Jason E Summers,** ARiA (United States)

13476-28 • 3:00 PM - 3:20 PM
Consideration of the use of gradient descent-trained expert systems to assure artificial intelligence systems
Author(s): **Jeremy Straub,** North Dakota State Univ. (United States)

Coffee Break 3:20 PM - 3:50 PM

SESSION 7: AI GOVERNANCE II

15 April 2025 • 3:50 PM - 4:50 PM | Osceola 4, Ballroom Level
Session Chair(s): **Nathaniel D. Bastian**, U.S. Military Academy (United States)

13476-21 • 3:50 PM - 4:10 PM
Secure and Decentralized Digital Twin Optimization: A Blockchain-Enabled Federated Learning Approach for IIoT
Author(s): **Jan Bieniek**, **Innocent B. Ababio**, **Mohamed Rahouti,** Fordham Univ. (United States); **Dinesh C. Verma,** IBM Corp. (United States); **Dinesh C. Verma,** IBM Corp. (United States); **Mohammed Aledhari,** Univ. of North Texas (United States)

13476-23 • 4:10 PM - 4:30 PM
Guardrails for safe implementations of AI-based services
Author(s): **Dinesh C. Verma, Radha Ratnaparkhi,** IBM Thomas J. Watson Research Ctr. (United States)

13476-18 • 4:30 PM - 4:50 PM
Quantifying adversarial risk of multimodal foundation models for military applications
Author(s): **George Cybenko**, **Paul S. Lintilhac,** Thayer School of Engineering at Dartmouth (United States); **Joshua M. Ackerman,** Dartmouth College (United States); **Nathaniel D. Bastian,** U.S. Military Academy (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
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Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13476-31 • 5:30 PM - 7:00 PM
A brief survey of the evaluation metrics for classification and object detection
Author(s): **Diego Marez**, **Roger Sengphanith, Shibin Parameswaran,** Naval Information Warfare Ctr. Pacific (United States)

CONFERENCE 13477

Unmanned Systems Technology XXVII

15 April 2025 | Sarasota 1, Ballroom Level

Conference Chair(s): **Paul L. Muench,** U.S. Army Combat Capabilities Development Command (United States); **Robert Diltz,** Air Force Civil Engineer Ctr. (United States); **Raja Suresh,** (United States)

Program Committee: **Anthony Jones,** Naval Information Warfare Ctr. Pacific (United States); **Sridhar Lakshmanan,** Univ. of Michigan-Dearborn (United States); **Camille S. Monnier,** Charles River Analytics, Inc. (United States); **Cynthia Nguyen,** Naval Information Warfare Ctr. Pacific (United States); **Raja Suresh,** Iyengar LLC (United States)

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 1: PHILOSOPHY AND ROBOTS

15 April 2025 • 11:00 AM - 12:40 PM | Sarasota 1, Ballroom Level
Session Chair(s): **Paul L. Muench**, U.S. Army Combat Capabilities Development Command (United States)

13477-1 • 11:00 AM - 11:40 AM
Improving robot legged locomotion through mechanics-aware design and control (Keynote Presentation)
Author(s): **Cynthia Sung,** Univ. of Pennsylvania (United States)

13477-2 • 11:40 AM - 12:00 PM
Exploring trust and autonomy: How information affects human-agent teaming performance
Author(s): **Audrey L. Aldridge,** Mississippi State Univ. (United States); **Andrew Buck**, **Derek Anderson,** Univ. of Missouri (United States); **Christopher Hudson**, **Karl Smink,** Mississippi State Univ. (United States); **Victor Paul**, **Rachel Anderson**, **Drew Hoelscher,** U.S. Army DEVCOM Ground Vehicle Systems Ctr. (United States); **Mary Quinn,** Leidos, Inc. (United States); **Daniel Carruth**, **Cindy L. Bethel, Christopher T. Goodin,** Mississippi State Univ. (United States)

13477-3 • 12:00 PM - 12:20 PM
Contradictions of fuzzy logic to human intuition
Author(s): **Xinjia Chen,** Northwestern State Univ. (United States); **Paul Muench,** U.S. Army Combat Capabilities Development Command (United States)

13477-4 • 12:20 PM - 12:40 PM
Predicting vegetation override forces for path planning in off-road terrain
Author(s): **Christopher T. Goodin**, **Marc N. Moore**, **Ethan Salmon**, **Riku Kikuta,** Mississippi State Univ. (United States); **Michael P. Cole**, **Paramsothy Jayakumar,** U.S. Army DEVCOM Ground Vehicle Systems Ctr. (United States); **Brittney A. English,** Dynetics, Inc. (United States)

Lunch/Exhibition Break 12:40 PM - 2:30 PM

SESSION 2: AIRFIELD ROBOTICS

15 April 2025 • 2:30 PM - 3:10 PM | Sarasota 1, Ballroom Level

Session Chair(s): **Raja Suresh**

13477-6 • 2:30 PM - 2:50 PM
Metric-semantic reasoning, tool calling, and NLP interfaces: Using LLM's at the edge for human-robot teaming
Author(s): **Brian M. Robinson**, **Nathan Redmond**, **Zachary Adler,** Torch Technologies, Inc. (United States);**Robert Diltz,** Air Force Civil Engineer Ctr. (United States)

13477-8 • 2:50 PM - 3:10 PM
Open architecture experimentation telemetry system
Author(s): **David Jackson**, **Joseph Gareri**, **Brennan Haralson,** Torch Technologies, Inc. (United States);**Jonathan Huwaldt, Sean Overbey,** Crossflow Technologies, Inc. (United States)

Coffee Break 3:10 PM - 3:40 PM

SESSION 3: UP IN THE SKY, DOWN IN THE CULVERTS

15 April 2025 • 3:40 PM - 5:20 PM | Sarasota 1, Ballroom Level
Session Chair(s): **Paul L. Muench**, U.S. Army Combat Capabilities Development Command (United States)

13477-9 • 3:40 PM - 4:00 PM
Beyond visual line of sight drone simulator with user-defined risk layers
Author(s): **Surafel Anshebo, Kevin Kochersberger,** Virginia Polytechnic Institute and State Univ. (United States)

13477-10 • 4:00 PM - 4:20 PM
Uncrewed system localization using deliberate thermal features
Author(s): **Matthew A. Smith**, **Brandon M. Eubanks**, **Theodosis N. Tsengouras**, **Rebecca Macdonald**, **Noah E. Rinartz**, **Sagar Sarkar, Monica R. Garcia,** Embry-Riddle Aeronautical Univ. (United States)

13477-11 • 4:20 PM - 4:40 PM
Experimental studies of multirobot leader-follower tasks using contraction metric learning
Author(s): **Wen-Chung Cheng**, **Zhen Ni, Xiangnan Zhong,** Florida Atlantic Univ. (United States)

13477-12 • 4:40 PM - 5:00 PM
Toward a foundation model for efficient damage assessment following natural disasters
Author(s): **Maryam Rahnemoonfar,** Lehigh Univ. (United States)

13477-13 • 5:00 PM - 5:20 PM
Flexible mission planning and dynamic reactive autonomy for heterogeneous unmanned vehicles operating in teams
Author(s): **Florian Segor**, **Joanna Müller,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); **Aleksej Buller,** Fraunhofer-Institut für Optronik (Germany); **Wilmuth Müller, Igor Tchouchenkov,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
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Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13477-14 • 5:30 PM - 7:00 PM
Deviation of fuzzy logic from earthling logic
Author(s): **Xinjia Chen,** Northwestern State Univ. (United States); **Paul Muench,** U.S. Army Combat Capabilities Development Command (United States)

13477-15 • 5:30 PM - 7:00 PM
Extending UAV flight time in emergency situations: optimizing power splitting for wireless energy and data transfer
Author(s): **FNU Dhruv**, **Liberty Pigg**, **Hemani Kaushal, Touria El Mezyani,** Univ. of North Florida (United States)

13477-16 • 5:30 PM - 7:00 PM
Improved culvert inspection with the hydraulic inspection vehicle explorer 3.0
Author(s): **Brandon Gamble,** The Univ. of Vermont (United States); **Evan Trombley,** University of Vermont (United States); **Sathi Sai Krishna Reddy,** Indian Institute of Technology Madras (India); **Dryver R. Huston, Tian Xia,** The Univ. of Vermont (United States)

CONFERENCE 13478

Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Sensing XXVI

14 - 16 April 2025 | Naples 2, Ballroom Level

Conference Chair(s): **Jason A. Guicheteau,** DEVCOM Chemical Biological Ctr. (United States); **Christopher R. Howle,** Defence Science and Technology Lab. (United Kingdom); **Tanya L. Myers,** Pacific Northwest National Lab. (United States)

Program Committee: **Christopher C. Carter,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States); **Augustus W. Fountain,** Univ. of South Carolina (United States); **Nathaniel R. Gomer,** The Pennsylvania State Univ. (United States); **Timothy J. Johnson,** Pacific Northwest National Lab. (United States); **Lars Landström,** FOI-Swedish Defence Research Agency (Sweden); **Tyler Miller,** Defense Threat Reduction Agency (United States); **Paul M. Pellegrino,** DEVCOM Army Research Lab. (United States); **Sherrie S. Pilkington,** Intelligence Advanced Research Projects Activity (United States); **Michael Shepard,** Naval Surface Warfare Ctr. Indian Head Div. (United States)

Monday 14 April 2025

SESSION 1: REMOTE CBRNE SENSING

14 April 2025 • 8:30 AM - 10:00 AM | Naples 2, Ballroom Level
Session Chair(s): **Christopher R. Howle**, Defence Science and Technology Lab. (United Kingdom)

13478-1 • 8:30 AM - 9:00 AM
Comparative study on remote Raman sensing of hydrogen and chlorine gas *(Invited Paper)*
Author(s): **Frank Duschek**, **Arne Walter**, **Matthias Hollmann,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Frank Wilsenack, Arne Ficks,** Wehrwissenschaftliche Institut für Schutztechnologien – ABC-Schutz (Germany)

13478-55 • 9:00 AM - 9:20 AM
Long wave infrared hyperspectral imager for airborne chemical detection from a Group 2 UAS.
Author(s): **Adam L. Bingham**, **Edward T. Knobbe**, **Jason T. Akagi**, **Byron Wolfe**, **Kellen Yamamoto,** Spectrum Photonics, Inc. (United States); **Paul G. Lucey,** Spectrum Photonics, Inc. (United States), Hawai'i Institute of Geophysics and Planetology (United States), Univ. of Hawai'i at Manoa (United States)

13478-4 • 9:20 AM - 9:40 AM
Development of a robotic multimodal device for forensic analysis, unknown object analysis, anomaly detection and material inspection
Author(s): **Marek Kotrlý,** Ministry of the Interior of the Czech Republic (Czech Republic); **Josef Uher**, **Jana Bohačová,** Radalytica a.s. (Czech Republic); **Ivana Turkova, Petr Čejka,** Ministry of the Interior of the Czech Republic (Czech Republic)

13478-3 • 9:40 AM - 10:00 AM
Threat anomaly detection (ThreAD) algorithm compared to other anomaly detection techniques
Author(s): **Eric R. Languirand**, **Matthew Collins,** DEVCOM Chemical Biological Ctr. (United States); **Jacob Buchman,** DEVCOM Chemical Biological Ctr., Army Educational Outreach (United States)

Coffee Break 10:00 AM - 10:30 AM

SESSION 2: EXPLOSIVE MATERIAL SENSING

14 April 2025 • 10:30 AM - 11:50 AM | Naples 2, Ballroom Level
Session Chair(s): **Nathaniel R. Gomer**, The Pennsylvania State Univ. (United States)

13478-6 • 10:30 AM - 10:50 AM
Spectroscopic quantification of chlorates, perchlorates and their mixtures
Author(s): **Victor Waller**, **Felix Olsson, Lars Landström,** FOI-Swedish Defence Research Agency (Sweden)

13478-7 • 10:50 AM - 11:10 AM
Stand-off dual-comb spectrometry: towards traces of explosives detection on moving targets
Author(s): **Vasili G. Savitski**, **James Feehan**, **Marek Michalowski,** Fraunhofer UK Research Ltd. (United Kingdom); **Kerry Alton**, **Lauren Holley**, **Jayne Newton,** Defence Science and Technology Lab. (United Kingdom); **Michael R. Papantonakis**, **Andrew McGill, Viet Nguyen,** U.S. Naval Research Lab. (United States)

13478-9 • 11:10 AM - 11:30 AM
Portable terahertz sensor for spectral imaging of chemicals
Author(s): **Uzair Aalam**, **Khushboo Singh**, **Aparajita Bandyopadhyay, Amartya Sengupta,** Indian Institute of Technology Delhi (India)

13478-8 • 11:30 AM - 11:50 AM
Machine learning-based decision analytics tools: A new paradigm for explosives and illicit drug detection
Author(s): **Thoi Nguyen,** U.S. Dept. of Homeland Security (United States)

Lunch Break 11:50 AM - 1:20 PM

SESSION 3: AEROSOL CHARACTERIZATION

14 April 2025 • 1:20 PM - 2:20 PM | Naples 2, Ballroom Level
Session Chair(s): **Sherrie S. Pilkington**, Intelligence Advanced Research Projects Activity (United States)

13478-12 • 1:20 PM - 1:40 PM
High-speed single-pixel long-wave-infrared trace aerosols detection system
Author(s): **Thomas Gray**, **Derek Wood**, **Wynn Bowers**, **Anish K. Goyal**, **Erik Lenferink**, **Lucas Black**, **Charles Meeske, Steve Korbly,** Block Engineering, LLC (United States)

13478-13 • 1:40 PM - 2:00 PM
Spectral reflectance of common surfaces for (laser) detection of aerosols and gases
Author(s): **David Cancino**, **Jeremy Erickson**, **Tanya L. Myers, Timothy Johnson,** Pacific Northwest National Lab. (United States)

13478-10 • 2:00 PM - 2:20 PM
Standoff aerosol sensing with dual frequency comb spectroscopy
Author(s): **Garrett C. Mathews**, **Alyssa Lalko**, **Scott Egbert**, **Graeme Gillespie,** Univ. of Colorado Boulder (United States); **Nazanin Hoghooghi,** National Institute of Standards and Technology (United States), Univ. of Colorado Boulder (United States); **Peter Chang,** Univ. of Colorado Boulder (United States); **Amanda Makowiecki**, **Anthony Harness**, **Kevin Williamson,** LongPath Technologies, Inc. (United States); **Anna Ziola**, **Anne Handschy**, **Douglas Day**, **Masayuki Takeuchi,** Univ. of Colorado Boulder (United States); **Jiang Li,** hQphotonics Inc (United States); **Tin Komljenovic,** Nexus Photonics (United States); **Kerry Vahala,** Caltech (United States); **John Bowers,** Univ. of California, Santa Barbara (United States); **Satoshi Takahama,** École Polytechnique Fédérale de Lausanne (Switzerland), Univ. of Colorado Boulder (United States); **Daven Henze**, **Jose L. Jimenez**, **Scott A. Diddams,** Univ. of Colorado Boulder (United States); **Gregory B. Rieker,** Univ. of Colorado Boulder (United States), LongPath Technologies, Inc. (United States)

Coffee Break 2:20 PM - 2:50 PM

SESSION 4: CHEMICAL HAZARD SENSING

14 April 2025 • 2:50 PM - 3:50 PM | Naples 2, Ballroom Level
Session Chair(s): **Timothy J. Johnson**, Pacific Northwest National Lab. (United States)

13478-15 • 2:50 PM - 3:10 PM
Infrared signatures of dimethyl methylphosphonate (DMMP) and its thermal degradation products
Author(s): **Natalie Gese, Hergen Eilers,** Washington State Univ. (United States)

13478-16 • 3:10 PM - 3:30 PM
Photocatalysis of dimethyl methylphosphonate on anhydrous and natural kaolinite and their infrared signatures
Author(s): **Natalie Gese, Hergen Eilers,** Washington State Univ. (United States)

13478-18 • 3:30 PM - 3:50 PM
Toward a portable stimulated Raman scattering system: insights from benchtop ultrafast coherent Raman studies
Author(s): **Sang-Hoon Nam**, **Kasey A. Shashaty**, **Álvaro-Miguel F. Galiana**, **Matthew Yeung**, **Phillip D. Keathley**, **Ian Hunter**, **Kyung-Han Hong, Michael Zervas,** Massachusetts Institute of Technology (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 5: ADVANCES IN CBRNE SIGNATURES AND SENSOR ALGORITHMS

15 April 2025 • 11:00 AM - 12:00 PM | Naples 2, Ballroom Level
Session Chair(s): **Christopher C. Carter**, Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

13478-21 • 11:00 AM - 11:20 AM
Modeling and validation of aerosolized materials using the complex refractive index spectra
Author(s): **Tanya L. Myers**, **Schuyler Lockwood**, **Tracy Baker**, **Jessica Salcido, Timothy Johnson,** Pacific Northwest National Lab. (United States)

13478-2 • 11:20 AM - 11:40 AM
Machine learning-based prescreener for subsurface object detection by GPR
Author(s): **Carson Pautz**, **Mitch Dickey**, **Brendan J. Alvey, Dominic K. C. Ho,** Univ. of Missouri (United States)

13478-22 • 11:40 AM - 12:00 PM
Arbitrary-shape scatterer models for interpretation of optical spectral data
Author(s): **Andrew R. Shabaev**, **Robert Furstenberg**, **Tyler Huffman**, **Chris A. Kendziora, R. Andrew McGill,** U.S. Naval Research Lab. (United States)

Lunch/Exhibition Break 12:00 PM - 1:50 PM

SESSION 6: NOVEL SPECTROSCOPIC SENSING I: JOINT SESSION WITH CONFERENCES 13449 AND 13478

15 April 2025 • 1:50 PM - 3:10 PM | Naples 2, Ballroom Level
Session Chair(s): **Christopher R. Howle**, Defence Science and Technology Lab. (United Kingdom)

13478-23 • 1:50 PM - 2:10 PM
Molecule-specific, stand-off airborne substance detection with Deep-UV excited, range-resolved, single-photon "Quantum" Raman spectroscopy: Towards an optical "tricorder" with molecular LIDAR
Author(s): **David J. M. Stothard**, **Roman Spesyvtsev**, **John Leck**, **Rory Pringle**, **Carolyn O'Dwyer**, **Craig Hunter, Stuart Bennett,** Fraunhofer Ctr. for Applied Photonics (United Kingdom)

13449-22 • 2:10 PM - 2:30 PM
Quantitative detection of chemical agents with SERS sensors
Author(s): **Li-Lin Tay,** National Research Council Canada (Canada)

13478-24 • 2:30 PM - 2:50 PM
Advances in sensing technology for chemical and biological threats
Author(s): **Nathaniel R. Gomer, Amanda Clase,** The Pennsylvania State Univ. (United States)

13478-25 • 2:50 PM - 3:10 PM
Shared embeddings for synthetic data generation across sensor modalities
Author(s): **Cate M. Dunham**, **Kevin J Metzler,** Worcester Polytechnic Institute (United States); **Chia-Wei Tsai**, **Thomas Cao,** Defense Threat Reduction Agency (United States); **Joshua Uzarski,** U.S. Army Combat Capabilities Development Command Soldier Ctr. (United States); **Randy C. Paffenroth,** Worcester Polytechnic Institute (United States)

Coffee Break 3:10 PM - 3:40 PM

SESSION 7: NOVEL SPECTROSCOPIC SENSING II: JOINT SESSION WITH CONFERENCES 13449 AND 13478

15 April 2025 • 3:40 PM - 5:00 PM | Naples 2, Ballroom Level
Session Chair(s): **Luisa T. M. Profeta**, Rigaku Analytical Devices (United States)

13478-26 • 3:40 PM - 4:00 PM
ClearShot: a through-bottle Raman sensor for noncontact chemical detection and identification
Author(s): **Rusha Chatterjee**, **Katharine Lunny**, **Michael Primrose**, **Michael Hilton**, **Michael Chase**, **Michael Ascenzi, Jay Giblin,** Physical Sciences Inc. (United States)

13449-24 • 4:00 PM - 4:20 PM
CWA and TIC library generation and laboratory validation on field portable FTIR systems
Author(s): **Katelyn Koll**, **Evan Durnal, Sara Paahlar,** MRIGlobal (United States)

13478-27 • 4:20 PM - 4:40 PM
Applications of a trace standoff Raman detection system on robotic platforms
Author(s): **Robert D. Waterbury**, **James Andrews**, **Thuyan Conghuyentonnu**, **Kyle Jurrens**, **Tim Molner**, **Ryan Robins**, **Marshall Scott, Viktor Smolski,** Alakai Defense Systems, Inc. (United States)

13449-25 • 4:40 PM - 5:00 PM **(CANCELLED)**
Chromatoscopy: a new paradigm for chemical sensing
Author(s): **Tyler J. Huffman**, **Christopher J. Breshike**, **Daniel Corbin**, **Robert Furstenberg, R. Andrew McGill,** U.S. Naval Research Lab. (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13478-44 • 5:30 PM - 7:00 PM
IR absorption spectra for chemical warfare agents using density functional theory
Author(s): **Sonjae Wallace**, **Lou Massa,** The City Univ. of New York (United States); **Edward C. Michaelchuck**, **Rachel Viger**, **Scott Ramsey, Samuel G. Lambrakos,** U.S. Naval Research Lab. (United States)

13478-45 • 5:30 PM - 7:00 PM
In-situ and instantaneous detection of aerosolized chemical threats using chip-scale mass spectrometry
Author(s): **Ashish Chaudhary**, **Gottfried Kibelka, Gregory Vasquez,** Detect-ION LLC (United States)

13478-46 • 5:30 PM - 7:00 PM
Unmanned aerial vehicle integrated with a chemical sensors for real-time remote chemical detection and identification: Capabilities and limitations
Author(s): **Sonia Mathopo,** Protechnik Labs. (South Africa)

13478-47 • 5:30 PM - 7:00 PM
Neural network models for standoff detection and classification of chemical aerosols from infrared spectroscopy
Author(s): **Deborah Hunka**, **Adam Luxon**, **Jonathan Mueller**, **Miles Egan,** Leidos, Inc. (United States); **Justin Maughan,** Pratt Community College (United States); **Vanessa Lynch**, **Steven Pullins**, **Garrett Wendell**, **Meredith Melendez,** Leidos, Inc. (United States); **David Alburty**, **Darren Radke,** InnovaPrep LLC (United States); **Seth Henshaw,** Leidos, Inc. (United States)

13478-48 • 5:30 PM - 7:00 PM
An investigation of dynamic models for tracking a GPR mounted drone for searching subsurface objects
Author(s): **Dominic K. C. Ho**, **Mitch Dickey**, **Carson Pautz, Brendan J. Alvey,** Univ. of Missouri (United States)

13478-49 • 5:30 PM - 7:00 PM
Sub-ppm level detection for toxic NH_3 gas using a CuBr-based flexible gas detector
Author(s): **Jongwon Yoon,** Korea Institute of Materials Science (Korea, Republic of)

13478-56 • 5:30 PM - 7:00 PM
Chemical signatures of illegal drugs and HME production facilities
Author(s): **Oscar van der Jagt, Marta Jezierska,** TNO (Netherlands)

Wednesday 16 April 2025

SESSION 8: CBRNE FORENSICS

16 April 2025 • 8:10 AM - 9:50 AM | Naples 2, Ballroom Level
Session Chair(s): **Lars Landstrom**, FOI-Swedish Defence Research Agency (Sweden)

13478-28 • 8:10 AM - 8:30 AM
automated portable Raman microscope for field detection of explosives and drugs
Author(s): **Romain Blanchard**, **Tobias Mansuripur,** Pendar Technologies (United States); **Ashish Tripathi**, **Jason Guicheteau,** U.S. Army Combat Capabilities Development Command (United States); **Daryoosh Vakhshoori,** Pendar Technologies (United States)

13478-29 • 8:30 AM - 8:50 AM
Evaluation of the zero x plus/gold Raman microscope objective for representative sampling of pharmaceutical tablets
Author(s): **Augustus W. Fountain,** Univ. of South Carolina (United States)

13478-30 • 8:50 AM - 9:10 AM
Advances in trace CBE detection with deep UV Raman and fluorescence mapping spectroscopy
Author(s): **Rohit Bhartia**, **William Hug**, **Ray Reid**, **Quoc Nguyen**, **Ken Nguyen**, **Jason Micklewright,** Photon Systems, Inc. (United States); **Dayne Kemp,** UFO (United States)

13478-31 • 9:10 AM - 9:30 AM
Reference-free mapping of trace surface chemicals
Author(s): **Erik Lenferink**, **Anish K. Goyal**, **Wynn Bowers**, **Thomas Gray**, **Charles Meeske, Steve Korbly,** Block Engineering, LLC (United States)

13478-32 • 9:30 AM - 9:50 AM
Hybrid laser spectroscopy for real-time standoff detection of explosive residues on individuals
Author(s): **Marc Hans Steigleder**, **Anja Köhntopp**, **Lisa B. Dreier**, **Christoph Geiß, Frank Duschek,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

Coffee Break 9:50 AM - 10:20 AM

SESSION 9: RADIOLOIGCAL AND NUCLEAR

16 April 2025 • 10:20 AM - 12:10 PM | Naples 2, Ballroom Level
Session Chair(s): **Tanya L. Myers**, Pacific Northwest National Lab. (United States)

13478-33 • 10:20 AM - 10:50 AM
Overview of emerging sensing technologies for radiological-nuclear security *(Invited Paper)*
Author(s): **Zachary Myers,** Government of Canada (Canada)

13478-34 • 10:50 AM - 11:10 AM
Optimal distance and velocity for UAV localization of nuclear materials
Author(s): **Diksha Aggarwal**, **Kevin Kochersberger, Caleb Adams,** Virginia Polytechnic Institute and State Univ. (United States)

13478-35 • 11:10 AM - 11:30 AM
Next generation of optical detection for tritiated gases
Author(s): **John Kelly,** Savannah River National Lab. (United States)

13478-36 • 11:30 AM - 11:50 AM
Automated nuclear cloud feature extraction from film
Author(s): **Joel Khristy**, **Haley Duba-Sullivan**, **Thomas Karnowski**, **Pablo Moresco, Vincent Jodoin,** Oak Ridge National Lab. (United States)

13478-37 • 11:50 AM - 12:10 PM
New radiation damage measurements for a selection of phosphors irradiated with alpha particles
Author(s): **William A. Hollerman**, **John M. Miller,** Univ. of Louisiana at Lafayette (United States); **Nusrat H. Sarwahrdy,** Univ. of Maryland (United States), DEVCOM, ARL (United States); **John D Demaree,** DEVCOM (United States); **G. Amalthea Tobare,** Univ. Maryland Balt. Cnty (United States); **Nicholas P Barbieri**, **Vijay Parameshwaran,** DEVCOM, ARL (United States); **Johnathon C. Gonsoulin,** Univ. of Louisiana at Lafayette (United States); **Marc S Litz,** DEVCOM, ARL (United States)

Lunch/Exhibition Break 12:10 PM - 1:40 PM

SESSION 10: MICROSENSORS AND INTEGRATED PHOTONICS

16 April 2025 • 1:40 PM - 3:00 PM | Naples 2, Ballroom Level
Session Chair(s): **Augustus W. Fountain**, Univ. of South Carolina (United States)

13478-38 • 1:40 PM - 2:00 PM
Interferometric reflectance imaging sensor for biothreat detection (IRIS-BD)
Author(s): **Rusha Chatterjee**, **Rebecca Scheidt**, **Michael Hilton**, **Tiffany Yu,** Physical Sciences Inc. (United States); **M. Selim Ünlü,** iRiS Kinetics (United States); **Jay Giblin, Julia Dupuis,** Physical Sciences Inc. (United States)

13478-39 • 2:00 PM - 2:20 PM
Part-per-trillion, selective, and robust gaseous sensing using FLOWER
Author(s): **Tsu-Te Judith Su**, **Yinchao Xu,** The Univ. of Arizona (United States); **Allison Stanko**, **Chloe S. Cerione,** Caltech (United States); **Sartanee Suebka**, **Euan J. McLeod,** The Univ. of Arizona (United States); **Brian Stoltz,** Caltech (United States)

13478-41 • 2:20 PM - 2:40 PM
Enhancing microtoroidal gas sensors with nanophotonic structures
Author(s): **Euan McLeod**, **Kunal Sharma**, **Sartanee Suebka, Tsu-Te Judith Su,** The Univ. of Arizona (United States)

13478-40 • 2:40 PM - 3:00 PM
Optically-induced modifications to sorbent films for chemical sensing
Author(s): **Nathan F. Tyndall,** U.S. Naval Research Lab. (United States); **Erik D. Emmons**, **Phillip G. Wilcox**, **Kevin C. Hung,** DEVCOM Chemical Biological Ctr. (United States); **Marcel W. Pruessner**, **R. Andrew McGill,** U.S. Naval Research Lab. (United States); **Ethan Luta**, **Jordan N. Butt**, **Benjamin L. Miller,** Univ. of Rochester Medical Ctr. (United States); **Todd H. Stievater,**U.S. Naval Research Lab. (United States)

CONFERENCE 13479

Signal Processing, Sensor/Information Fusion, and Target Recognition XXXIV

14 - 16 April 2025 | Osceola 1, Ballroom Level

Conference Chair(s): **Ivan Kadar,** Interlink Systems Sciences, Inc. (United States); **Erik P. Blasch,** Air Force Research Lab. (United States); **Lynne L. Grewe,** California State Univ., East Bay (United States)

Conference Co-Chair(s): **Bhashyam Balaji,** Defence Research and Development Canada (Canada); **Thia Kirubarajan,** TrackGen Solutions Inc. (Canada)

Program Committee: **Yaakov Bar-Shalom,** Univ. of Connecticut (United States); **Dave Braines,** IBM United Kingdom Ltd. (United Kingdom); **Alex L. Chan,** DEVCOM Army Research Lab. (United States); **Kuochu C. Chang,** George Mason Univ. (United States); **Mark J. Carlotto,** General Dynamics Mission Systems (United States); **Chee-Yee Chong,** Independent Consultant (United States); **Frederick E. Daum,** Raytheon Missiles & Defense (United States); **Jean Dezert,** ONERA (France); **Laurie H. Fenstermacher,** Air Force Research Lab. (United States); **Brian Jalaian,** DEVCOM Army Research Lab. (United States); **Georgiy M. Levchuk,** Aptima, Inc. (United States); **James Llinas,** Univ. at Buffalo (United States); **Uttam Majumder,** National Geospatial-Intelligence Agency (United States); **Harley R. Myler,** Lamar Univ. (United States); **Ruixin Niu,** Virginia Commonwealth Univ. (United States); **Sean M. O'Rourke**, **Todd Rovito,** Air Force Research Lab. (United States); **Andreas E. Savakis,** Rochester Institute of Technology (United States); **Robert W. Schutz,** Consultant (United States); **Stelios C.A. Thomopoulos,** National Ctr. for Scientific Research "Demokritos" (Greece); **Andre J. Van Rynbach,** Air Force Research Lab. (United States); **Edward L. Waltz,** Virginia Polytechnic Institute and State Univ. (United States); **Peter K. Willett,** Univ. of Connecticut (United States); **Kaipei Yang,** Plato Systems (United States); **Shanchieh Jay Yang,** Rochester Institute of Technology (United States); **Yufeng Zheng,** The Univ. of Mississippi Medical Ctr. (United States)

Monday 14 April 2025

SESSION 1: MULTISENSOR FUSION, MULTITARGET TRACKING, AND RESOURCE MANAGEMENT I

14 April 2025 • 8:00 AM - 10:10 AM | Osceola 1, Ballroom Level
Session Chair(s): **Ivan Kadar**, Interlink Systems Sciences, Inc. (United States)
8:00 - 8:10 AM: Opening Remarks

13479-1 • 8:10 AM - 8:30 AM
Deep distributed Kalman filter: an adaptive deep learning framework for distributed Kalman filtering
Author(s): **Naseem Alsadi**, **Stephen Andrew Gadsden,** McMaster Univ. (Canada); **John Yawney,** Adastra Corp. (Canada)

13479-2 • 8:30 AM - 8:50 AM
Derivation and adaptive enhancement of the sliding sigmoid filter
Author(s): **Naseem Alsadi**, **Brett Sicard**, **Stephen Andrew Gadsden,** McMaster Univ. (Canada); **John Yawney,** Adastra Corp. (Canada)

13479-3 • 8:50 AM - 9:10 AM
A comparative analysis of cubature Kalman fitlers
Author(s): **Quade Butler**, **Waleed Hilal,** McMaster Univ. (Canada); **Youssef Ziada,** Ford Motor Co. (United States); **Stephen Andrew Gadsden,** McMaster Univ. (Canada)

13479-4 • 9:10 AM - 9:30 AM
Locating and tracking an object across multiple video feeds using zero-shot object detection
Author(s): **Brad Killen**, **Audrey L. Aldridge**, **Paul Barrett,** Mississippi State Univ. (United States); **Jeremy Davis,** The Univ. of Alabama in Huntsville (United States); **Daniel Carruth, Cindy L. Bethel,** Mississippi State Univ. (United States)

13479-5 • 9:30 AM - 9:50 AM
System identification and state estimation for magnetorheological dampers
Author(s): **Patrick Kosierb**, **Yuandi Wu**, **Quade Butler**, **Brett Sicard, Stephen Andrew Gadsden,** McMaster Univ. (Canada)

13479-6 • 9:50 AM - 10:10 AM
Improved Distance Estimation In Dynamic Environments Through Multisensor Fusion With Extended Kalman Filter
Author(s): **Iffat Ara Ebu,** Mississippi State Univ. (United States); **Fahmida Islam,** Western Kentucky Univ. (United States); **Mohammad Abdus Shahid Rafi**, **Mahfuzur Rahman**, **Umar Iqbal, John Ball,** Mississippi State Univ. (United States)

Coffee Break 10:10 AM - 10:40 AM

SESSION 2: MULTISENSOR FUSION, MULTITARGET TRACKING, AND RESOURCE MANAGEMENT II

14 April 2025 • 10:40 AM - 11:40 AM | Osceola 1, Ballroom Level
Session Chair(s): **Ivan Kadar**, Interlink Systems Sciences, Inc. (United States)

13479-7 • 10:40 AM - 11:00 AM
A model-based transformer approach for multitarget state estimation with a large number of sensors
Author(s): **Rosario Di Carlo**, **Domenico Gaglione**, **Leonardo M. Millefiori, Paolo Braca,** STO-CMRE (Italy)

13479-8 • 11:00 AM - 11:20 AM
Bayesian deep learning with particle flow using the exponential family of probability densities
Author(s): **Frederick E. Daum**, **Liyi Dai**, **Jim Huang, Arjang Noushin,** Raytheon (United States)

13479-9 • 11:20 AM - 11:40 AM
Numerical experiments for Bayesian deep learning with particle flow and the exponential family
Author(s): **Frederick E. Daum,** Raytheon (United States)

Lunch Break 11:40 AM - 1:50 PM

PANEL DISCUSSION: LLMS FOR INFORMATION FUSION

14 April 2025 • 1:50 PM - 4:50 PM | Osceola 1, Ballroom Level

View Full Details: spie.org/dcs/llms-for-information-fusion

Join this informative panel discussion on large language models for information fusion.

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 3: INFORMATION FUSION METHODOLOGIES AND APPLICATIONS I

15 April 2025 • 11:00 AM - 12:00 PM | Osceola 1, Ballroom Level
Session Chair(s): **Erik P. Blasch**, Air Force Research Lab. (United States)

13479-10 • 11:00 AM - 11:20 AM
Accelerometer bias estimation for UAVs using EKF-based vision-aided navigation
Author(s): **Djedjiga Belfadel,** Fairfield Univ. (United States); **David Haessig, Cherif Chibane,** AuresTech Inc. (United States)

13479-12 • 11:20 AM - 11:40 AM
Deep learning-based flight path prediction for optical UAV tracking
Author(s): **Christopher Naverschnigg**, **Denis Ojdanic**, **Andreas Sinn, Georg Schitter,** Technische Univ. Wien (Austria)

13479-13 • 11:40 AM - 12:00 PM
Sequential evidential decision making for real-time drone anomaly detection: a Sim2Real VBS approach
Author(s): **Pierre Pathe,** CS Group (France), CREA (France); **Anne Laure Jousselme**, **Benjamin Pannetier,** CS Group (France); **Olivier Bartheye,** Ctr. de Recherche de l'École de l'Air (France)

Lunch/Exhibition Break 12:00 PM - 1:30 PM

SESSION 4: INFORMATION FUSION METHODOLOGIES AND APPLICATIONS II

15 April 2025 • 1:30 PM - 2:50 PM | Osceola 1, Ballroom Level
Session Chair(s): **Erik P. Blasch**, Air Force Research Lab. (United States)

13479-15 • 1:30 PM - 1:50 PM
Data fusion at the far edge
Author(s): **Erik P. Blasch,** Air Force Research Lab. (United States); **Yu Chen,** Binghamton Univ. (United States); **Jia Li,** Oakland Univ. (United States); **Arlsan Munir,** Florida Atlantic Univ. (United States); **Erika Ardiles-Cruz, Robert Ewing,** Air Force Research Lab. (United States)

13479-16 • 1:50 PM - 2:10 PM
Edge-based computing challenges and opportunities for sensor fusion: Panel review
Author(s): **Erik P. Blasch,** Air Force Research Lab. (United States); **Yu Chen,** Binghamton Univ. (United States); **Fred Daum,** Raytheon (United States); **Genshe Chen,** Intelligent Fusion Technology, Inc. (United States); **Andreas Savakis,** Rochester Institute of Technology (United States)

13479-17 • 2:10 PM - 2:30 PM
Information systems with a deep VAULT
Author(s): **Erik P. Blasch, Alex Aved,** Air Force Research Lab. (United States)

13479-19 • 2:30 PM - 2:50 PM
A novel formula to compute the hypotheses for a reliable sensor fusion system using dependency
Author(s): **Youssef Bazzi,** Univ. of Detroit Mercy (United States)

Coffee Break 2:50 PM - 3:20 PM

SESSION 5: INFORMATION FUSION METHODOLOGIES AND APPLICATIONS III

15 April 2025 • 3:20 PM - 4:20 PM | Osceola 1, Ballroom Level
Session Chair(s): **Lynne L. Grewe**, California State Univ., East Bay (United States)

13479-20 • 3:20 PM - 3:40 PM
Statemental credibility logic for intelligent information processing
Author(s): **Xinjia Chen,** Northwestern State Univ. (United States)

13479-21 • 3:40 PM - 4:00 PM
Leveraging hierarchical methods for multi-sensor fusion
Author(s): **Sean Saud**, **Connar Hite,** Univ. of Dayton (United States); **Ashley Diehl,** Air Force Research Lab. (United States); **Tarek Taha,** Univ. of Dayton (United States)

13479-67 • 4:00 PM - 4:20 PM
Cognitive Warfare Execution: Harnessing Strategic Playbooks and Influence Frameworks
Author(s): **Laurie Fenstermacher,** Air Force Research Lab. (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level

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Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13479-44 • 5:30 PM - 7:00 PM
IR absorption spectra for explosives using density functional theory
Author(s): **Sonjae Wallace,** Lehman College, The City Univ. of New York (United States); **Lou Massa,** Hunter College, The City Univ. of New York (United States); **Scott Ramsey, Samuel G. Lambrakos,** U.S. Naval Research Lab. (United States)

13479-45 • 5:30 PM - 7:00 PM
A topological data analysis based feature engineering for automatic target recognition user interface (TDA2TRU)
Author(s): **Paul Schrader,** Air Force Research Lab. - Rome (United States); **Honey Love,** SUNY Polytechnic Institute (United States); **Thomas Breimer,** Union College (United States)

13479-47 • 5:30 PM - 7:00 PM
A comparison of physical models with Kalman filtering to deep learning models for complex system state estimation and prediction
Author(s): **Spencer Pollard, Sam B. Siewert,** California State Univ., Chico (United States)

13479-48 • 5:30 PM - 7:00 PM
Experimental setup and compensation method to improve the accuracy of TES-based direct emissivity estimation using LWIR hyperspectral cameras
Author(s): **Yewon Jang, Sungho Kim,** Yeungnam Univ. (Korea, Republic of)

13479-49 • 5:30 PM - 7:00 PM
Enhancing identification performance in optical database test images through domain generalization techniques
Author(s): **Do SaeByeol, Sungho Kim,** Yeungnam Univ. (Korea, Republic of)

13479-50 • 5:30 PM - 7:00 PM
Enhancing drone surveillance using pattern notches: experimental direction finding results
Author(s): **Macarena Varela**, **Wulf-Dieter Wirth, Ravali Nalla,** Fraunhofer-Institut für Kommunikation, Informationsverarbeitung und Ergonomie FKIE (Germany)

13479-51 • 5:30 PM - 7:00 PM
Physics-informed artificial intelligence adaptive raster scanning for sparse single photon imaging
Author(s): **Luke McEvoy**, **Daniel Tafone**, **Yong Meng Sua, Yuping Huang,** Stevens Institute of Technology (United States)

13479-53 • 5:30 PM - 7:00 PM
Optimized waveforms for low frequency to medium frequency (LF-MF) communications.
Author(s): **Mohiuddin Ahmed,** HRL Labs., LLC (United States)

13479-54 • 5:30 PM - 7:00 PM
Robust inter-battery factor analysis by uniform sample contributions
Author(s): **Ian Tomeo,** Rochester Institute of Technology (United States); **Panagiotis Markopoulos,** The Univ. of Texas at San Antonio (United States); **Andreas Savakis,** Rochester Institute of Technology (United States)

13479-55 • 5:30 PM - 7:00 PM
Maximum likelihood identification of an inertial sensor drift model combining GM1, WP, and WN
Author(s): **Shida Ye**, **Yaakov Bar-Shalom**, **Peter K. Willett, Ahmed Zaki,** Univ. of Connecticut (United States)

13479-56 • 5:30 PM - 7:00 PM
A multilayer perceptron for binary damage detection and damage localization via electrical impedance tomography measurements of damaged structural material
Author(s): **John Wertz,** Air Force Research Lab. (United States); **Laura Homa**, **Chenoa Flournoy,** Univ. of Dayton Research Institute (United States); **Tyler Tallman,** Purdue University (United States)

Wednesday 16 April 2025

SESSION 6: SIGNAL AND IMAGE PROCESSING, AND INFORMATION FUSION APPLICATIONS I

16 April 2025 • 8:10 AM - 9:50 AM | Osceola 1, Ballroom Level
Session Chair(s): **Lynne L. Grewe**, California State Univ., East Bay (United States)

13479-23 • 8:10 AM - 8:30 AM
FashionBody and SmartFashion: innovative components for a fashion recommendation system
Author(s): **Lynne L. Grewe**, **Julia U. Reddy**, **Varshashree Dasuratha**, **Jesus Rodriguez, Nicholas Ferreira,** California State Univ., East Bay (United States)

13479-24 • 8:30 AM - 8:50 AM
Multi-output and single-output regression models for body fitness analysis in FitnessBody
Author(s): **Lynne L. Grewe**, **Wendy Zhou**, **Nicholas Ferreira, Jesus Rodriguez,** California State Univ., East Bay (United States)

13479-25 • 8:50 AM - 9:10 AM
Artificial insect vision for fast multi-target recognition
Author(s): **Pavlo A. Molchanov,** IPD Scientific, LLC (United States)

13479-26 • 9:10 AM - 9:30 AM
Enhancement of remote photoplethysmography (rPPG) performance in low-light environments through illumination map estimation
Author(s): **Seongryeong Lee, Sungho Kim,** Yeungnam Univ. (Korea, Republic of)

13479-27 • 9:30 AM - 9:50 AM
Remote respiratory rate monitoring using an LWIR camera
Author(s): **Jaeho Kim, Sungho Kim,** Yeungnam Univ. (Korea, Republic of)

Coffee Break 9:50 AM - 10:20 AM

SESSION 7: SIGNAL AND IMAGE PROCESSING, AND INFORMATION FUSION APPLICATIONS II

16 April 2025 • 10:20 AM - 11:20 AM | Osceola 1, Ballroom Level
Session Chair(s): **Lynne L. Grewe**, California State Univ., East Bay (United States)

13479-28 • 10:20 AM - 10:40 AM
Signal processing, medical misdiagnosis, Hankel transforms and the kitchen sink
Author(s): **Molly M. Scheffe,** School of Hard Knocks (United States)

13479-29 • 10:40 AM - 11:00 AM
End-to-end underwater object recognition using multi-polarization image fusion with single-photon LiDAR
Author(s): **Oladipupo Adeoluwa**, **Sevgi Gurbuz**, **Anirban Swakshar**, **Cooper Coldwell**, **Karsten Schnier**, **Margaret Kim, Patrick Kung,** The Univ. of Alabama (United States)

13479-32 • 11:00 AM - 11:20 AM
Localization in Three Dimensions with Time Differences of Arrival from a Network of Hydrophones
Author(s): **Alex H. Kachergis,** Univ. of Connecticut (United States)

Lunch/Exhibition Break 11:20 AM - 12:50 PM

SESSION 8: SIGNAL AND IMAGE PROCESSING, AND INFORMATION FUSION APPLICATIONS III

16 April 2025 • 12:50 PM - 1:50 PM | Osceola 1, Ballroom Level
Session Chair(s): **Lynne L. Grewe**, California State Univ., East Bay (United States)

13479-33 • 12:50 PM - 1:10 PM
Assessing image quality as a driver of object detection performance using a pseudo-physical parametric image chain
Author(s): **Austin C. Bergstrom, David W. Messinger,** Rochester Institute of Technology (United States)

13479-34 • 1:10 PM - 1:30 PM
Deep learning for MPC extraction and false detection
Author(s): **Howard Dai,** Yale Univ. (United States); **Jack Chuang**, **Jian Wang**, **Samuel Berweger, David Griffith,** National Institute of Standards and Technology (United States)

13479-36 • 1:30 PM - 1:50 PM
Fusion of eddy current testing data and scanning acoustic microscopy data for microtexture region characterization
Author(s): **Laura Homa**, **Tyler Lesthaeghe,** Univ. of Dayton Research Institute (United States); **Matthew Cherry, John Wertz,** Air Force Research Lab. (United States)

Coffee Break 1:50 PM - 2:20 PM

SESSION 9: SIGNAL AND IMAGE PROCESSING, AND INFORMATION FUSION APPLICATIONS IV

16 April 2025 • 2:20 PM - 4:20 PM | Osceola 1, Ballroom Level

Session Chair(s): **Lynne L. Grewe**, California State Univ., East Bay (United States)

13479-37 • 2:20 PM - 2:40 PM

Rank reduction of LSTM models for online vibration signal compensation on edge computing devices

Author(s): **Josh McGuire**, **Joud N. Satme**, **Daniel Coble**, **Austin R. J. Downey**, **Jason Bakos**, **Ryan Yount,** Univ. of South Carolina (United States); **Arion Pons,** Chalmers Univ. of Technology (Sweden)

13479-39 • 2:40 PM - 3:00 PM

Radar target recognition based on extracted scattering features

Author(s): **Ismail I. Jouny,** Lafayette College (United States)

13479-40 • 3:00 PM - 3:20 PM

Diverse MIMO radar waveform design for high-resolution image formation incorporating machine learning

Author(s): **Michael D. Zoltowski, Stewart Moffat,** Purdue Univ. (United States)

13479-41 • 3:20 PM - 3:40 PM

Leveraging synthetic SAR data for improved real-world applications

Author(s): **SaeByeol Do, Sungho Kim,** Yeungnam Univ. (Korea, Republic of)

13479-42 • 3:40 PM - 4:00 PM

Connecting disparate modeling and simulation studies through design of experiments, surrogate modeling, and Bayesian networks

Author(s): **Amir K. Saeed,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States); **Anthony Trautman,** United States Air Force (United States); **Chris Windle, Benjamin M. Rodriguez,** Johns Hopkins Univ. Applied Physics Lab., LLC (United States)

13479-43 • 4:00 PM - 4:20 PM

Colorblind Accessibility Tool: A Mobile Solution for Improved Color Perception

Author(s): **Miguel A. Goenaga-Jimenez**, **Josue G. Cardona-Cotto**, **Manuel A. Millan-Chacon, Alcides Alvear-Suárez,** Univ. Ana G. Méndez (United States)

CONFERENCE 13480

Disruptive Technologies in Information Sciences IX

14 - 16 April 2025 | Miami 1, Ballroom Level

Conference Chair(s): **Misty Blowers,** Datalytica (United States); **Bryant T. Wysocki,** Air Force Research Lab. (United States)

Conference Co-Chair(s): **Russell D. Hall,** Zel Technologies, LLC (United States); **Gaby Rossi,** 2025 Acting Conference Chair - Datalytica (United States)

Program Committee: **Scotty Black,** Naval Postgraduate School (United States); **Yu Chen,** Binghamton Univ. (United States); **Todd Gagnon,** Datalytica LLC (United States); **Angela Morales,** (United States); **Aleksey Panasyuk,** Syracuse Univ. (United States); **Jon R. Williams,** Datalytica (United States)

Monday 14 April 2025

OPENING REMARKS

14 April 2025 • 1:00 PM - 1:15 PM
Remarks by conference chair Misty Blowers.

SESSION 1: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

14 April 2025 • 1:15 PM - 2:05 PM | Miami 1, Ballroom Level
Session Chair(s): **Misty Blowers**, Datalytica LLC (United States)

13480-4 • 1:15 PM - 1:40 PM
Comparative analysis of reinforcement learning models for real-time control of an exoskeleton using EMG and IMU data
Author(s): **Robert P. Dizor,** Univ. of West Florida (United States); **Anil Raj,** Univ. of West Florida (United States), Florida Institute of Human & Machine Cognition (United States)

13480-32 • 1:40 PM - 2:05 PM
The impact of ai-generated videos on student learning and engagement in a virtual learning environment for online STEM courses.
Author(s): **Denise Daniels**, **Joon Suk Lee**, **Kyra Evans, Jordanne Davenport,** Virginia State Univ. (United States)

Coffee Break 2:05 PM - 2:35 PM

SESSION 2: ROBOTICS, AUTONOMOUS SYSTEMS, AND OPTIMIZATION

14 April 2025 • 2:35 PM - 3:50 PM | Miami 1, Ballroom Level
Session Chair(s): **Kang Jun Bai**, Air Force Research Lab. (United States)

13480-8 • 2:35 PM - 3:00 PM
Consciousness in autonomous systems: What is it and how to build it?
Author(s): **George Cybenko,** Thayer School of Engineering at Dartmouth (United States)

13480-9 • 3:00 PM - 3:25 PM
Multi-modal sensing and reasoning-based fusion for robust tracking under physical and cyber attacks
Author(s): **Jane Shin**, **Andres Pulido**, **Baker Herrin**, **Aditya Penumarti, Nikhil Iyer,** Univ. of Florida (United States)

13480-29 • 3:25 PM - 3:50 PM
Equitable Data Generation for Multi-Domain Operations: Dynamic Fundamentally-Informed Neural Switching
Author(s): **Danielle Lee**, **Collin Meese**, **Kurt Hammen, Mark Nejad,** Univ. of Delaware (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 3: BLOCKCHAIN AND SECURE COMMUNICATIONS I

15 April 2025 • 11:00 AM - 11:50 AM | Miami 1, Ballroom Level
Session Chair(s): **Jodi Sangster**, Datalytica (United States)

13480-10 • 11:00 AM - 11:25 AM
Cognitive sharding: enhancing blockchain scalability and efficiency through cognitive partitioning
Author(s): **Naseem Alsadi,** McMaster Univ. (Canada); **Ahmad Kanoun,** York University (Canada); **Stephen Andrew Gadsden,** McMaster Univ. (Canada); **John Yawney,** Adastra Corp. (Canada)

13480-11 • 11:25 AM - 11:50 AM
Ethereum blockchain-driven solutions for smart industries: A simulation-based approach
Author(s): **Naseem Alsadi**, **Stephen Andrew Gadsden,** McMaster Univ. (Canada); **John Yawney,** Adastra Corp. (Canada)

Lunch/Exhibition Break 11:50 AM - 1:20 PM

SESSION 4: BLOCKCHAIN AND SECURE COMMUNICATIONS II

15 April 2025 • 1:20 PM - 3:00 PM | Miami 1, Ballroom Level
Session Chair(s): **Gabriela Rossi**, Datalytica LLC (United States)

13480-12 • 1:20 PM - 1:45 PM
Survey of signal temporal logic specification mining: techniques, applications, and future directions
Author(s): **Jialiang Fan,** University of Notre Dame (United States); **Fanxin Kong,** Univ. of Notre Dame (United States)

13480-13 • 1:45 PM - 2:10 PM
Natural language interaction protocol (NLIP)
Author(s): **Sanjay Aiyagari,** Red Hat (United States); **Elisa Bertino,** Purdue University (United States); **Jan Bieniek,** Fordham University (United States); **Yan-Ming Chiou,** SRI International (United States); **Raj Dodhiawala,** Independent (United States); **Sean Hughes,** ServiceNow (United States); **Sugih Jamin,** University of Michigan (United States); **Ashish Kundu,** Cisco (United States); **Jon Lenchner,** IBM Thomas J. Watson Research Ctr. (United States); **Matthew Mauriello,** University of Delaware (United States); **Abhay Ratnaparkhi,** IBM (United States); **Mohamed Rahouti,** Fordham University (United States); **Tom Sheffler,** Independent (United States); **Chien-Chung Shen,** University of Delaware (United States); **Dinesh C. Verma,** IBM Thomas J. Watson Research Ctr. (United States); **Jinjun Xiong,** University at Buffalo (United States); **Luyi Xing,** Indiana University (United States); **Wenpeng Yen,** Pennsylvania State University (United States); **Hasan Zengin,** University of Michigan (United States)

13480-14 • 2:10 PM - 2:35 PM
Post quantum cryptography recent developments
Author(s): **Lubjana Beshaj,** U.S. Military Academy (United States)

13480-15 • 2:35 PM - 3:00 PM
The dual role of emerging technologies in innovation and security
Author(s): **Lubjana Beshaj,** U.S. Military Academy (United States); **Samuel J. Crislip,** 782nd Military Intelligence Battalion (United States)

Coffee Break 3:00 PM - 3:30 PM

SESSION 5: EMERGING AND DISRUPTIVE TECHNOLOGIES IN SECURITY AND CRYPTOGRAPHY

15 April 2025 • 3:30 PM - 4:20 PM | Miami 1, Ballroom Level
Session Chair(s): **Robert P. Dizor**, Univ. of West Florida (United States)

13480-16 • 3:30 PM - 3:55 PM
Exploring Intelligent and Efficient Cognition for Radio Frequency Fingerprints
Author(s): **Kang Jun Bai,** Air Force Research Lab. (United States); **Zhaoxi Li,** Univ. of Maryland, Baltimore County (United States)

13480-5 • 3:55 PM - 4:20 PM
Defensive strategies to prevent adversarial AI manipulation
Author(s): **Misty Blowers**, **Todd Gagnon**, **Angela Morales**, **Gabriela Rossi, Meredith Jones,** Datalytica LLC (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13480-27 • 5:30 PM - 7:00 PM
An AI model performance benchmarking harness for reproducible performance evaluation
Author(s): **Venkateswara R. Dasari,** DEVCOM Army Research Lab. (United States); **Jakob Adamas,** Parsons Corp. (United States); **Manuel Vindiola,** DEVCOM Army Research Lab. (United States)

13480-28 • 5:30 PM - 7:00 PM
Database optimization: Automation, security and resiliency
Author(s): **Kelly W. Bennett,** DEVCOM Army Research Lab. (United States); **James Robertson,** Clearhaven Technologies LLC (United States)

13480-33 • 5:30 PM - 7:00 PM
Bringing tomorrow's energy facility to life: a digital twin and XR training approach
Author(s): **Marc Asselin Asselin,** IB3 Global Solutions (United States)

Wednesday 16 April 2025

SESSION 6: ADVANCED COMPUTING, QUANTUM, AND NEUROMORPHIC ARCHITECTURE

16 April 2025 • 9:30 AM - 11:40 AM | Miami 1, Ballroom Level
Session Chair(s): **Jodi Sangster**, Datalytica (United States)

13480-17 • 9:30 AM - 9:55 AM
Photonic quantum state engineering in microring resonator based silicon nanophotonic circuits
Author(s): **Edwin E. Hach,** Rochester Institute of Technology (United States)

13480-18 • 9:55 AM - 10:20 AM
Neuromorphing computing using photorefractive materials
Author(s): **Sebastian Alveteg**, **Marc Sciamanna,** CentraleSupélec (France); **Alex Fürbach,** Macquarie Univ. (Australia); **Delphine Wolfersberger,** CentraleSupélec (France)

Coffee Break • 10:20 AM - 10:50 AM

13480-19 • 10:50 AM - 11:15 AM
Physics-guided convolutional neural networks for enhanced post-disaster debris detection and impact assessment using semi-supervised learning
Author(s): **Kishor Datta Gupta**, **Mohd Ariful Haque,** Clark Atlanta Univ. (United States); **Marufa Kama,** BRAC Univ. (Bangladesh); **Rakib Hossain Rifat,** Texas Tech Univ. (United States);**Roy George,** Clark Atlanta Univ. (United States)

13480-20 • 11:15 AM - 11:40 AM
Towards a digital twin for ice sheet modeling
Author(s): **Maryam Rahnemoonfar, YoungHyun Koo,** Lehigh Univ. (United States)

Lunch/Exhibition Break 11:40 AM - 1:10 PM

D.E.C.E.I.V.E.R SESSION KICKOFF

16 April 2025 • 1:10 PM - 1:20 PM | Miami 1, Ballroom Level
Introduction for the D.E.C.E.I.V.E.R special session.

SESSION 7: D.E.C.E.I.V.E.R I

16 April 2025 • 1:20 PM - 3:00 PM | Miami 1, Ballroom Level
Session Chair(s): **Yu Chen**, Binghamton Univ. (United States)

13480-21 • 1:20 PM - 1:45 PM
SynthClassify: An LLM-driven framework for generating and classifying persuasive text
Author(s): **Aleksey Panasyuk,** Air Force Research Lab. (United States)

13480-22 • 1:45 PM - 2:10 PM
Topological frequency feature analysis for AIGC authentication
Author(s): **Paul Schrader,** Air Force Research Lab. (United States); **Nihal Poredi,** Binghamton Univ. (United States); **Gage M. Cosgrove,** Air Force Research Lab. (United States); **Enoch Solomon,** Virginia State Univ. (United States); **Yu Chen,** Binghamton Univ. (United States)

13480-23 • 2:10 PM - 2:35 PM
Echoes amplified: a study of AI-generated content and digital echo chambers
Author(s): **Ashley Kearney,** Virginia State Univ. (United States); **Nihal Poredi,** Binghamton Univ. (United States); **Joseph A. Shelton,** Virginia State Univ. (United States); **Seden Akcinaroglu**, **Ekrem Karakoc**, **Thi Tran, Yu Chen,** Binghamton Univ. (United States)

13480-24 • 2:35 PM - 3:00 PM
Navigating the infodemic: a comprehensive review of research on misinformation's impact on minority youth
Author(s): **Lulu Al Arfaj,** Binghamton Univ. (United States); **Joon Suk Lee**, **Joseph A. Shelton,** Virginia State Univ. (United States); **Zeynep Ertem**, **Thi Tran, Yu Chen,** Binghamton Univ. (United States)

Coffee Break 3:00 PM - 3:30 PM

SESSION 8: D.E.C.E.I.V.E.R II

16 April 2025 • 3:30 PM - 4:20 PM | Miami 1, Ballroom Level
Session Chair(s): **Yu Chen**, Binghamton Univ. (United States)

13480-25 • 3:30 PM - 3:55 PM
LEAD-AI: lightweight entropy analysis for distinguishing AI-generated images from genuine photographs
Author(s): **Monica Sudarsan,** Virginia State Univ. (United States); **Nihal Poredi**, **Evan Maurer,** Binghamton Univ. (United States); **Enoch Solomon,** Virginia State Univ. (United States); **Yu Chen,** Binghamton Univ. (United States)

13480-26 • 3:55 PM - 4:20 PM
ANCHOR: Authenticating avatars and virtual objects via anchors in the real world
Author(s): **Qian Qu, Yu Chen,** Binghamton Univ. (United States)

PANEL DISCUSSION: DETECTING AND DETERRING MISINFORMATION AND DECEPTION

16 April 2025 • 4:20 PM - 5:20 PM | Miami 1, Ballroom Level

View Full Details: spie.org/dcs/deceiver-panel

The advent of AI-generated content (AIGC) offers unmatched creativity and productivity but also presents significant societal challenges. Join this panel on detecting/deterring misinformation and deception focusing on disseminating education on counteracting erroneous information, verifying evidence, and reporting.

CONFERENCE 13481

CONFERENCE CO-SPONSOR

ThermoFisher SCIENTIFIC

Smart Biomedical and Physiological Sensor Technology XXII

14 April 2025 | Sarasota 1, Ballroom Level

Conference Chair(s): **Brian M. Cullum,** Univ. of Maryland, Baltimore County (United States); **Eric S. McLamore,** Clemson Univ. (United States); **Pietro Strobbia,** Univ. of Cincinnati (United States)

Program Committee: **Matthew B. Coppock,** DEVCOM Army Research Lab. (United States); **Sudhir Dahal,** Thermo Fisher Scientific Inc. (United States); **Andrew M. Fales**, **Ilko K. Ilev,** U.S. Food and Drug Administration (United States); **Curtis Jones,** Under Armour (United States); **Douglas Kiehl,** Eli Lilly and Company (United States); **Yong Lin Kong,** The Univ. of Utah (United States); **T. Joshua Pfefer,** U.S. Food and Drug Administration (United States); **Narsingh Bahadur Singh,** Univ. of Maryland, Baltimore County (United States); **Sundaram Singh,** Banaras Hindu Univ., Varanasi (India); **Michael Weinrich,** Eunice Kennedy Shriver National Institute of Child Health and Human Development (United States); **Sheng Xu,** Univ. of California, San Diego (United States)

Monday 14 April 2025

SESSION 1: COMPLEX ANALYSIS FOR COMPLEX DATA: FROM PHYSIOLOGY TO MICROSCOPY

14 April 2025 • 8:20 AM - 10:00 AM | Sarasota 1, Ballroom Level
Session Chair(s): **Brian M. Cullum**, Univ. of Maryland, Baltimore County (United States)

13481-1 • 8:20 AM - 8:40 AM
Real-time Mueller matrix imaging of biological tissue
Author(s): **Ariel Fernández, Roman Demczylo,** Univ. de la República Uruguay (Uruguay)

13481-2 • 8:20 AM - 8:40 AM
Exploring and comparing machine learning models to predict benzodiazepine prescriptions
Author(s): **Sachin Karki, Yufeng Zheng,** The Univ. of Mississippi Medical Ctr. (United States)

13481-3 • 8:40 AM - 9:00 AM
Deep long short-term memory (LSTM) network for continuous blood pressure monitoring
Author(s): **Rafita Haque,** Florida International Univ. (United States); **Chunlei Wang,** Univ. of Miami (United States); **Nezih Pala,** Florida International Univ. (United States)

13481-4 • 9:00 AM - 9:20 AM
Integrating fMRI brain connectivity and large language models to understand hallucinations in schizophrenia
Author(s): **Janerra D. Allen,** Univ. of Maryland, Baltimore County (United States); **L. Elliot Hong,** Univ. of North Texas Health Science Ctr. of Houston (United States); **Fow-Sen Choa,** Univ. of Maryland, Baltimore County (United States)

13481-5 • 9:20 AM - 9:40 AM
High resolution and sensitivity nanosensors based on lens free microscopy
Author(s): **Euan J. McLeod,** Wyant College of Optical Sciences (United States)

13481-6 • 9:40 AM - 10:00 AM
Super-resolution fluorescence microscopy and quantitative phase microscopy *(Invited Paper)*
Author(s): **Peng Gao**, **Sha An**, **Juanjuan Zheng, Kai Wen,** Xidian Univ. (China)

Coffee Break 10:00 AM - 10:30 AM

SESSION 2: DISCOVERY AND APPLICATIONS OF SENSING MATERIALS: FROM APTAMERS TO SEMICONDUCTORS

14 April 2025 • 10:30 AM - 12:10 PM | Sarasota 1, Ballroom Level
Session Chair(s): **Eric S. McLamore**, Clemson Univ. (United States)

13481-7 • 10:30 AM - 11:00 AM
Scanning electrochemical and ion conductance microscopy using aptamer functionalized probes *(Invited Paper)*
Author(s): **Robert A. Lazenby**, **Ana Ramirez**, **Debashis Sen, Yusuf Muhammed,** Florida State Univ. (United States)

13481-8 • 11:00 AM - 11:20 AM
Rapid discovery of bio-recognition elements to detect biomarkers relevant for airman health and performance *(Invited Paper)*
Author(s): **Alyssa Cramer**, **Monica Wolfe**, **Sean Webb,** BlueHalo (United States); **Yaroslav Chushak,** Henry M. Jackson Foundation (United States); **Svetlana Harbaugh, Jorge Chavez,** Air Force Research Lab. (United States)

13481-9 • 11:20 AM - 11:40 AM
A Listeria monocytogenes aptasensor on laser inscribed graphene for food safety monitoring in hydroponic water
Author(s): **Nicholas Cavallaro,** Univ. of Florida (United States); **Geisianny Moreira**, **Diana Vanegas,** Clemson Univ. (United States); **Carmen Gomes,** Iowa State Univ. of Science and Technology (United States); **Eric S. McLamore,** Clemson Univ. (United States)

13481-10 • 11:40 AM - 12:10 PM
Effect of ionic valency and nitration on the performance of perovskites for dielectric energy storage material *(Invited Paper)*
Author(s): **Narasimha S. Prasad,** NASA Langley Research Ctr. (United States); **Aria Tauraso**, **Bradley Arnold**, **Fow-Sen Choa**, **Brian M. Cullum**, **Krishna Machuga,** Univ. of Maryland, Baltimore County (United States); **Kamdeo D. Mandal,** Indian Institute of Technology (BHU), Varanasi (India); **Narsingh B. Singh,** Univ. of Maryland, Baltimore County (United States)

Lunch Break 12:10 PM - 1:40 PM

SESSION 3: ADVANCING SENSING MATERIALS

14 April 2025 • 1:40 PM - 2:50 PM | Sarasota 1, Ballroom Level
Session Chair(s): **Pietro Strobbia**, Univ. of Cincinnati (United States)

13481-11 • 1:40 PM - 2:10 PM
Engineering DNA-based tools for chemical and biological sensing *(Invited Paper)*
Author(s): **Devleena Samanta,** The Univ. of Texas at Austin (United States)

13481-13 • 2:10 PM - 2:30 PM
Advancing SERS biosensing through adaptable sensor design
Author(s): **Pietro Strobbia,** Univ. of Cincinnati (United States)

13481-14 • 2:30 PM - 2:50 PM
Sonochemically Synthesized ZnO Nanowires (NWs) based Wearable Sensor for Non-invasive Glucose Detection in Sweat
Author(s): **G. M. Mehedi Hossain**, **Ahmed Hasnain Jalal**, **Hasina Huq**, **Nazmul Islam**, **Karen Lozano,** The Univ. of Texas Rio Grande Valley (United States); **Nezih Pala,** Florida International Univ. (United States); **Fahmida Alam,** The Univ. of Texas Rio Grande Valley (United States)

Coffee Break 2:50 PM - 3:20 PM

SESSION 4: ADVANCED MATERIALS AND TECHNIQUES FOR SENSING

14 April 2025 • 3:20 PM - 4:40 PM | Sarasota 1, Ballroom Level
Session Chair(s): **Brian M. Cullum**, Univ. of Maryland, Baltimore County (United States)

13481-15 • 3:20 PM - 3:40 PM
Spectral Biomarker studies for tracking Colitis Progression in Dextran Sodium Sulphate Treated Mouse sera Using ATR-FTIR Spectroscopy
Author(s): **A. G. Unil Perera,** Georgia State Univ. (United States)

13481-16 • 3:40 PM - 4:00 PM
Comparative analysis of cortico-basal ganglia-thalamo-cortical loop connectivity states across different fMRI datasets
Author(s): **Sravani Varanasi**, **Janerra D. Allen,** Univ. of Maryland, Baltimore County (United States); **Tianye Zhai**, **Hong Gu**, **Yihong Yang,** National Institute on Drug Abuse (United States); **Elliot Hong,** Univ. of North Texas Health Science Ctr. of Houston (United States); **Fow-Sen Choa,** Univ. of Maryland, Baltimore County (United States)

13481-17 • 4:00 PM - 4:20 PM
Optical sensing of point and line defects in Fe-doped bulk ZnSe crystals
Author(s): **Lauren Gower**, **Eric Bowman,** Univ. of Maryland, Baltimore County (United States); **Daniel Gower,** Univ. of Maryland, College Park (United States); **Leslie Scheurer,** Univ. of Maryland, Baltimore County (United States); **Nithin Tangirala,** Univ. of Maryland, College Park (United States); **Ching Hua Su,** NASA Marshall Space Flight Ctr. (United States); **Bradley Arnold**, **Fow-Sen Choa**, **Brian M. Cullum, Narsingh Bahadur Singh,** Univ. of Maryland, Baltimore County (United States)

13481-18 • 4:20 PM - 4:40 PM
Raman and reflection methods to evaluate defects in sensor crystals.
Author(s): **Leslie Scheurer**, **Eric Bowman**, **Lauren Gower**, **Jakob Peabody**, **Bradley Arnold,** Univ. of Maryland, Baltimore County (United States); **Ching Hua Su,** NASA Marshall Space Flight Ctr. (United States); **Fow-Sen Choa**, **Brian M. Cullum, Narsingh Bahadur Singh,** Univ. of Maryland, Baltimore County (United States)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13481-20 • 5:30 PM - 7:00 PM
Public health precautions for preventing malaria using environmental data
Author(s): **Zahidur Rahman,** LaGuardia Community College (United States); **Leonid Roytman,** The Graduate Ctr., CUNY (United States); **Abdelhamid Kadik,** LaGuardia Community College (United States); **Dilara Rosy,** Marks Home Care (United States); **Pradipta Nandi,** All India Institute of Medical Sciences, New Delhi (India); **Md. S. Prodhan,** Government Tolaram College (Bangladesh)

13481-22 • 5:30 PM - 7:00 PM
A hybrid sensing system for automated wrist physiological signal measurement and vascular evaluation
Author(s): **Wei-Cheng Cheng**, **Chen-Li Lin,** National Taiwan Univ. (Taiwan);**Shu-Sheng Lee,** National Taiwan Ocean Univ. (Taiwan);**Hsiang-Chieh Lee,** Graduate Institute of Photonics and Optoelectronics, National Taiwan Univ. (Taiwan);**Chih-Kung Lee,** Graduate School of Advanced Technology, National Taiwan Univ. (Taiwan);**Jiun-Woei Huang,** National Taiwan Univ. (Taiwan)

13481-23 • 5:30 PM - 7:00 PM
Fast sensing of bone mineral density using electrical properties
Author(s): **Nithin Tangirala**, **Daniel Gower,** Univ. of Maryland, College Park (United States); **Eric Bowman**, **Lauren Gower**, **Leslie Scheurer,** Univ. of Maryland, Baltimore County (United States); **Ching Hua Su,** NASA Marshall Space Flight Ctr. (United States); **Bradley Arnold**, **Fow-Sen Choa**, **Brian M. Cullum**, **Rachit Sood, Narsingh Bahadur Singh,** Univ. of Maryland, Baltimore County (United States)

13481-24 • 5:30 PM - 7:00 PM
Performance of low temperature synthesized TM-doped ZnSe for laser sensors
Author(s): **Daniel Gower**, **Eric Bowman**, **Nithin Tangirala**, **Lauren Gower**, **Leslie Scheurer,** Univ. of Maryland, Baltimore County (United States); **Ching Hua Su,** NASA Marshall Space Flight Ctr. (United States); **Bradley Arnold**, **Fow-Sen Choa**, **Brian M. Cullum, Narsingh Bahadur Singh,** Univ. of Maryland, Baltimore County (United States)

13481-25 • 5:30 PM - 7:00 PM
Chemical sensing using laser host materials: Bulk and nanoengineered materials
Author(s): **Eric Bowman**, **Leslie Scheurer**, **Akshay Patel**, **Daniel Gower**, **Lauren Gower,** Univ. of Maryland, Baltimore County (United States); **Ching Hua Su,** NASA Marshall Space Flight Ctr. (United States); **Bradley Arnold**, **Fow-Sen Choa**, **Brian M. Cullum**, **Rachit Sood, Narsingh Bahadur Singh,** Univ. of Maryland, Baltimore County (United States)

13481-27 • 5:30 PM - 7:00 PM
Photo-catalyzed sustainable approach for the synthesis of Schiff base via C-N bond formation
Author(s): **Sundaram Singh,** Indian Institute of Technology (BHU), Varanasi (India)

13481-26 • 5:30 PM - 7:00 PM

A Multilayer Supervised Hebbian Learning Framework for Multisite Stimulation.

Author(s): **Josh Li**, **Sravani Varanasi,** Univ. of Maryland, Baltimore County (United States); **Elliot Hong,** Department of Psychiatry and Behavioral Sciences McGovern Medical School at UTHealth Houston (United States); **Fow-Sen Choa,** Univ. of Maryland, Baltimore County (United States)

CONFERENCE 13482

Ocean Sensing and Monitoring XVI

16 - 17 April 2025 | Osceola 4, Ballroom Level

Conference Chair(s): **Weilin Hou,** Office of Naval Research (Singapore); **Linda J. Mullen,** Naval Air Warfare Ctr. Aircraft Div. (United States)

Conference Co-Chair(s): **Alexander Ignatov,** NOAA Ctr. for Satellite Applications and Research (United States)

Program Committee: **Dennis V. Delic,** Defence Science and Technology Group (Australia); **Kyle R. Drexler,** Naval Information Warfare Ctr. Pacific (United States); **David W. Illig,** Naval Air Warfare Ctr. Aircraft Div. (United States); **Silvia C. Matt,** U.S. Naval Research Lab. (United States)

Wednesday 16 April 2025

SESSION 1: PASSIVE SENSORS

16 April 2025 • 10:40 AM - 12:10 PM | Osceola 4, Ballroom Level
Session Chair(s): **Weilin Hou**, Office of Naval Research (Singapore); **Linda J. Mullen**, Naval Air Warfare Ctr. Aircraft Div. (United States)
Opening remarks 10:30 -10:40 AM

13482-1 • 10:40 AM - 11:10 AM
Clutter-limited Sensing: The devil is in the sampling details! *(Invited Paper)*
Author(s): **Michael J. Wardlaw,** Office of Naval Research (United States)

13482-2 • 11:10 AM - 11:30 AM
Passive underwater geolocalization and navigation using novel polarization image sensors
Author(s): **Viktor Gruev,** Univ. of Illinois (United States)

13482-3 • 11:30 AM - 11:50 AM
Validation of remote sensing reflectance from PACE OCI Sensor in coastal waters
Author(s): **Eder Herrera-Estrella**, **Alexander Gilerson,** The City College of New York (United States); **Robert Foster, Ahmed El-Habashi,** U.S. Naval Research Lab. (United States)

13482-4 • 11:50 AM - 12:10 PM
Time-of-flight multiphase flow velocity measurement method based on air fraction analysis *(Invited Paper)*
Author(s): **Adrian Tong,** Virginia Polytechnic Institute and State Univ. (United States); **Albrey de Clerck,** NanoSonic, Inc. (United States); **Sydney Lopez**, **Jilian Deane,** Virginia Polytechnic Institute and State Univ. (United States); **Noah Jones**, **Hang Ruan,** NanoSonic, Inc. (United States); **Wing Ng,** Virginia Polytechnic Institute and State Univ. (United States)

Lunch/Exhibition Break 12:10 PM - 1:50 PM

SESSION 2: LASER-BASED SENSORS I

16 April 2025 • 1:50 PM - 2:50 PM | Osceola 4, Ballroom Level
Session Chair(s): **Linda J. Mullen**, Naval Air Warfare Ctr. Aircraft Div. (United States)

13482-5 • 1:50 PM - 2:10 PM
DFB fiber laser-based underwater acoustic sensing
Author(s): **Mehmet Ziya Keskin,** TOBB ETÜ (Turkey); **Abdulkadir Yentür,** TOBB ETÜ (Turkey), Bilkent Univ. (Turkey); **Ibrahim Ozdur,** TOBB ETÜ (Turkey)

13482-7 • 2:10 PM - 2:30 PM
Vectorial structured light propagating underwater through optical turbulence generated by Rayleigh-Bénard natural convection
Author(s): **Francesca Fede**, **Thomas Kelly**, **Owen O'Malley**, **Charles Nelson**, **Svetlana Avramov-Zamurovic,** U.S. Naval Academy (United States); **Andrew Forbes,** Univ. of the Witwatersrand, Johannesburg (South Africa); **Nate Ferlic,** Naval Air Warfare Ctr. Aircraft Div. (United States)

13482-8 • 2:30 PM - 2:50 PM

Enhancing wavefront resolution using the Gerchberg-Saxton phase retrieval algorithm for gaussian beams in underwater Rayleigh-Bénard convection
Author(s): **Owen O'Malley**, **Svetlana Avramov-Zamurovic,** U.S. Naval Academy (United States); **Nathaniel Ferlic,** Naval Air Warfare Ctr. Aircraft Div. (United States); **Matthew Kalensky,** Naval Surface Warfare Ctr. Dahlgren Div. (United States); **Peter Judd,** U.S. Naval Research Lab. (United States)

Coffee Break 2:50 PM - 3:20 PM

SESSION 3: LASER-BASED SENSORS II

16 April 2025 • 3:20 PM - 4:40 PM | Osceola 4, Ballroom Level
Session Chair(s): **David W. Illig**, Naval Air Warfare Ctr. Aircraft Div. (United States)

13482-9 • 3:20 PM - 3:40 PM
Performance analysis of underwater optical wireless communication in dynamic ocean waters: a study using regional ocean modeling for eastern Florida coastal water
Author(s): **Hemani Kaushal**, **Esau Larios,** Univ. of North Florida (United States); **Cigdem Akan,** U.S. Army Corps of Engineers (United States)

13482-10 • 3:40 PM - 4:00 PM
Underwater ranging in scattering environments using structured optical beams with varying longitudinal wavenumbers
Author(s): **Yuxiang Duan**, **Yingning Wang**, **Huibin Zhou**, **Zile Jiang**, **Ruoyu Zeng**, **Hongkun Lian**, **Yue Zuo**, **Zixun Zhao**, **Muralekrishnan Ramakrishnan**, **Xinzhou Su,** The Univ. of Southern California (United States); **Robert Bock,** R-Dex Systems, Inc. (United States); **Moshe Tur,** Tel Aviv Univ. (Israel); **Alan E. Willner,** The Univ. of Southern California (United States)

13482-11 • 4:00 PM - 4:20 PM
Ocean LiDAR using gallium nitride laser excitation for determining subsurface water temperature.
Author(s): **Ondrej Kitzler**, **Herman Li**, **Carolyn J. Taylor**, **Judith Dawes**, **Helen M. Pask**, **James Downes, David J. Spence,** Macquarie Univ. (Australia)

13482-12 • 4:20 PM - 4:40 PM
LiDAR pulse analysis in turbid and debris-laden environments
Author(s): **Jarom Jackson,** Naval Surface Warfare Ctr. Panama City Div. (United States)

Thursday 17 April 2025

SESSION 5: MACHINE LEARNING

17 April 2025 • 10:50 AM - 11:50 AM | Osceola 4, Ballroom Level
Session Chair(s): **David W. Illig**, Naval Air Warfare Ctr. Aircraft Div. (United States)

13482-19 • 10:50 AM - 11:10 AM
FishART: A platform for enhancing underwater fish detection and classification
Author(s): **Iffat Ara Ebu,** Mississippi State Univ. (United States); **M. M. Nabi,** Western Kentucky Univ. (United States); **Chiranjibi Shah,** Mississippi State Univ. (United States); **Jack Prior,** Northern Gulf Institute, National Marine Fisheries Service (United States); **Matthew D. Grossi,** Southeast Fisheries Science Ctr., National Marine Fisheries Service (United States); **Farron Wallace**, **Timothy Rowell**, **Ryan Caillouet**, **Matthew Campbell,** National Marine Fisheries Service (United States); **John E. Ball,** Mississippi State Univ. (United States); **Robert Moorhead,** Northern Gulf Institute, Mississippi State Univ. (United States)

13482-20 • 11:10 AM - 11:30 AM
Detection and localization of acoustic vulnerabilities of underwater data centers for remote surveillance
Author(s): **David Blow**, **Adnan Abdullah**, **Jennifer Sheldon**, **Weidong Zhu**, **Sara Rampazzi, Md Jahidul Islam,** Univ. of Florida (United States)

13482-21 • 11:30 AM - 11:50 AM
Machine Learning Based Seafloor Gas Seep Detection in Sonar Water Column Images
Author(s): **Sultan M. Manjur,** North Carolina State University (United States); **Volkan Senyurek**, **Ramon Kalski**, **Adam Skarke, Ali Cafer Gurbuz,** Mississippi State Univ. (United States)

Lunch/Exhibition Break 11:50 AM - 1:20 PM

SESSION 4: IN-SITU OCEANOGRAPHIC SENSORS

17 April 2025 • 1:20 PM - 3:00 PM | Osceola 4, Ballroom Level
Session Chair(s): **Weilin Hou**, Office of Naval Research (Singapore)

13482-13 • 1:20 PM - 1:40 PM
Design and development of metastructural integrated ocean bottom seismometer with mechanical bandpass structure
Author(s): **Tanuj Gupta, Bishakh Bhattacharya,** Indian Institute of Technology Kanpur (India)

13482-14 • 1:40 PM - 2:00 PM
UAV Deployable buoy-style sensor for in situ water quality monitoring
Author(s): **Md Asifuzzaman Khan**, **Matthew Burnett**, **Austin R. J. Downey**, **Joud N. Satme, Jasim Imran,** Univ. of South Carolina (United States)

13482-15 • 2:00 PM - 2:20 PM
Continuous water quality monitoring using field deployable NMR and explainable AI
Author(s): **Daniel Hancock**, **David P. Wamaį Winford Janvrin**, **Austin R. J. Downey**, **Mohammed Baalousha**, **Md Asifuzzaman Khan, Thomas M Crawford,** Univ. of South Carolina (United States)

13482-16 • 2:20 PM - 2:40 PM
Detection of benthic algae with a deployable fluorometer
Author(s): **Jack T. Kendall,** Univ. of Alaska Fairbanks (United States); **Yvonne M Vadeboncoeur,** Wright State University (United States); **Michael R. Roddewig,** Univ. of Alaska Fairbanks (United States)

13482-17 • 2:40 PM - 3:00 PM
Compact drone-compatible platform for polarimetric time-of-flight underwater imaging
Author(s): **Karsten Schnier**, **Anirban Swakshar**, **Cooper Coldwell**, **Sevgi Gurbuz**, **Seongsin M. Kim, Patrick Kung,** The Univ. of Alabama (United States)

Coffee Break 3:00 PM - 3:30 PM

BEST PAPER AWARD ANNOUNCEMENT

17 April 2025 • 3:30 PM - 3:50 PM | Osceola 4, Ballroom Level
Session Chair(s): **Weilin Hou**, Office of Naval Research (Singapore); **Linda J. Mullen**, Naval Air Warfare Ctr. Aircraft Div. (United States)
Please join us for the presentation of the 2025 Best Paper Award!

CONFERENCE 13483

Sensors and Systems for Space Applications XVIII

16 - 17 April 2025 | Sarasota 3, Ballroom Level

Conference Chair(s): **Genshe Chen,** Intelligent Fusion Technology, Inc. (United States); **Khanh D. Pham,** Air Force Research Lab. (United States)

Program Committee: **Erik P. Blasch,** Air Force Research Lab. (United States); **Richard M. Buchter,** DEVCOM Army Research Lab. (United States); **Yu Chen,** Binghamton Univ. (United States); **Huaining Cheng,** Air Force Research Lab. (United States); **Joseph L. Cox,** Leidos, Inc. (United States); **Eric K. Hall,** L3 Harris Technologies, Inc. (United States); **Waleed Hilal,** McMaster Univ. (Canada); **Simon Khan,** Air Force Research Lab. (United States); **Hang Liu,** The Catholic Univ. of America (United States); **Uttam Kumar Majumder,** National Geospatial-Intelligence Agency (United States); **Brian K. McComas,** Raytheon Missiles & Defense (United States); **Jeremy Murray-Krezan,** Trusted Space, Inc. (United States); **Tien M. Nguyen,** The Aerospace Corp. (United States); **Tuy Tan Nguyen,** Northern Arizona Univ. (United States); **Nicola Palombo Blascetta,** Satellogic Solutions SL (Spain); **Tod Manning Schuck,** Lockheed Martin Maritime Systems & Sensors (United States); **Dan Shen,** Intelligent Fusion Technology, Inc. (United States); **Hao Xu,** Univ. of Nevada, Reno (United States); **John Tower,** SRI International (United States); **Peng Wang,** Univ. of Kentucky (United States); **Yiran Yang,** The Univ. of Texas at Arlington (United States); **Qi Zhao,** Intelligent Fusion Technology, Inc. (United States); **Yufeng Zheng,** The Univ. of Mississippi Medical Ctr. (United States); **Quanyan Zhu,** New York Univ. (United States)

Tuesday 15 April 2025

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level

Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13483-19 • 5:30 PM - 7:00 PM

Optimizing satellite constellations for rapid revisit interferometric synthetic aperture radar (InSAR)

Author(s): **Grant Weerts**, **Michael R. Gustafson**, **David R. Smith, Michael Boyarsky,** Duke Univ. (United States)

13483-20 • 5:30 PM - 7:00 PM

Multi-objective system design of an active imaging mode for a sparse aperture telescope

Author(s): **Gregory Badura**, **Douglas Hope**, **Elena Plis,** Georgia Tech Research Institute (United States); **James Leger**, **Sudhakar Prasad,** Univ. of Minnesota, Twin Cities (United States); **Jeff Kuhn,** Univ. of Hawai'i (United States); **Ebenezer Arunkumar,** Georgia Tech Research Institute (United States); **Stuart Jefferies,** Georgia State Univ. (United States)

13483-21 • 5:30 PM - 7:00 PM

Decentralized estimation for satellite systems: enhancing robustness and reliability in distributed systems

Author(s): **Naseem Alsadi**, **S. Andrew Gadsden, John Yawney,** McMaster Univ. (Canada)

Wednesday 16 April 2025

SESSION 1: AI/ML FOR SPACE APPLICATION

16 April 2025 • 8:40 AM - 10:00 AM | Sarasota 3, Ballroom Level

Session Chair(s): **Simon Khan**, Air Force Research Lab. (United States); **Yu Chen**, Binghamton Univ. (United States)

13483-2 • 8:40 AM - 9:00 AM
Machine learning (ML) prediction of cislunar family and period on non-uniformly sampled line of sight time series
Author(s): **Gregory Badura**, **Ebenezer Arunkumar,** Georgia Tech Research Institute (United States); **Miguel Velez-Reyes,** The Univ. of Texas at El Paso (United States); **Koki Ho,** Georgia Institute of Technology (United States)

13483-3 • 9:00 AM - 9:20 AM
An investigation of PyTorch image models for remote sensing image classification
Author(s): **Hua-Mei Chen**, **Zhengyang Fan,** Intelligent Fusion Technology, Inc. (United States); **Erik Blasch**, **Khanh Pham**, **Simon Khan,** Air Force Research Lab. (United States); **Genshe Chen,** Intelligent Fusion Technology, Inc. (United States)

13483-4 • 9:20 AM - 9:40 AM
Derivative-free model reference adaptive control of an uncertain satellite system based on RBF neural networks
Author(s): **Alexandre McCafferty-Leroux**, **Yuandi Wu**, **Patrick Kosierb, S. Andrew Gadsden,** McMaster Univ. (Canada)

13483-5 • 9:40 AM - 10:00 AM
An application of the cognitive control framework for fault-tolerant nanosatellite attitude control
Author(s): **Alexandre McCafferty-Leroux**, **Brett Sicard**, **Alessandro Giuliano, S. Andrew Gadsden,** McMaster Univ. (Canada)

Coffee Break 10:00 AM - 10:30 AM

SESSION 2: SPACE DOMAIN AWARENESS AND ROBOTICS

16 April 2025 • 10:30 AM - 11:40 AM | Sarasota 3, Ballroom Level
Session Chair(s): **Conrad Kent**, Univ. of Cincinnati (United States)

13483-6 • 10:30 AM - 11:00 AM
pose estimation of a 3D tumbling CubeSat using a camera and LiDAR sensor-fusion approach *(Invited Paper)*
Author(s): **Conrad Kent**, **Ou Ma,** Univ. of Cincinnati (United States); **Douglas Marsh**, **Wei Huang, Eric Coghill,** Martian Sky Industries, LLC (United States)

13483-7 • 11:00 AM - 11:20 AM
External torque virtual sensors applied to a 6-DOF robot arm
Author(s): **Patrick Kosierb**, **Thomas French**, **Alex McCafferty-Leroux**, **Yuandi Wu, S. Andrew Gadsden,** McMaster Univ. (Canada)

13483-8 • 11:20 AM - 11:40 AM
Estimation strategies for fault detection in a 6-degree-of-freedom robotic manipulator
Author(s): **Thomas French**, **Patrick Kosierb**, **Alex McCafferty-Leroux**, **Yuandi Wu**, **Waleed Hilal, S. Andrew Gadsden,** McMaster Univ. (Canada)

Lunch/Exhibition Break 11:40 AM - 1:30 PM

SESSION 3: SENSOR AND SENSING FOR SPACE APPLICATION

16 April 2025 • 1:30 PM - 2:30 PM | Sarasota 3, Ballroom Level
Session Chair(s): **Richard M. Buchter**, DEVCOM Army Research Lab. (United States); **Mark E. Rosheim**, Ross-Hime Designs, Inc. (United States)

13483-11 • 1:30 PM - 1:50 PM
Particle distributions from images of laser propagation decay
Author(s): **Robert E. Peale**, **Chris Fredricksen,** Truventic LLC (United States); **Nagendra Dhakal**, **Cameron J. Kelley**, **Tommy Deyo**, **Mikhil Gotmare**, **Javier Ramos-Salamo,** Univ. of Central Florida (United States); **Philip Metzger,** Florida Space Institute (United States); **Addie Dove,** Univ. of Central Florida (United States)

13483-13 • 1:50 PM - 2:10 PM
On a new lightweight, low-cost, high-g, seeker gimbal
Author(s): **Mark E. Rosheim,** Ross-Hime Designs, Inc. (United States)

13483-32 • 2:10 PM - 2:30 PM
Advanced path planning and collision avoidance for quadcopter drones using deep Q-Learning 3D simulation
Author(s): **Simon Khan,** Air Force Research Lab. (United States)

Coffee Break 2:30 PM - 3:00 PM

SESSION 4: NETWORK AND CONTROL FOR SPACE APPLICATION

16 April 2025 • 3:00 PM - 4:30 PM | Sarasota 3, Ballroom Level

Session Chair(s): **Qi Zhao**, Intelligent Fusion Technology, Inc. (United States); **Alexandre McCafferty-Leroux**, McMaster Univ. (Canada)

13483-14 • 3:00 PM - 3:20 PM

Resiliency and robustness study of the Apache storm based distributed resilient remote sensing platform

Author(s): **Qi Zhao,** Intelligent Fusion Technology, Inc. (United States); **Cheng-Yu Cheng**, **Cheng-Ying Wu,** The Catholic Univ. of America (United States); **Yuchen Yang,** Intelligent Fusion Technology, Inc. (United States); **Hang Liu,** The Catholic Univ. of America (United States); **Genshen Chen,** Intelligent Fusion Technology, Inc. (United States)

13483-16 • 3:20 PM - 3:50 PM

Design and experimental validation of a high-altitude 2-DoF robotic tracking system for the air-LUSI mission

Author(s): **Alexandre McCafferty-Leroux**, **Andrew Newton,** McMaster Univ. (Canada); **Stephen Maxwell,** National Institute of Standards and Technology (United States); **S. Andrew Gadsden,** McMaster Univ. (Canada); **Kevin R. Turpie,** Univ. of Maryland, Baltimore County (United States)

13483-17 • 3:50 PM - 4:10 PM

Introduction of higher order moments for improved Kalman filtering

Author(s): **Waleed Hilal**, **Alex McCafferty-Leroux**, **S. Andrew Gadsden,** McMaster Univ. (Canada); **John Yawney,** McMaster Univ. (Canada), Adastra Corp. (Canada)

13483-31 • 4:10 PM - 4:30 PM

Physics-Guided Neural Network Modeling for Online Learning-Enhanced Adaptive Predictive Control of Quadruped Robot with Uncertain Terrains

Author(s): **Hao Xu**, **Sanket Lokhande,** Univ. of Nevada, Reno (United States); **Yajie Bao**, **Dan Shen, Genshe Chen,** Intelligent Fusion Technology, Inc. (United States)

CONFERENCE 13484

Sensing for Agriculture and Food Quality and Safety XVII

14 - 15 April 2025 | Daytona 1, Ballroom Level

Conference Chair(s): **Moon S. Kim,** Agricultural Research Service (United States); **Byoung-Kwan Cho,** Chungnam National Univ. (Korea, Republic of)

Conference Co-Chair(s): **Fartash Vasefi,** SafetySpect Inc. (United States)

Program Committee: **Insuck Baek**, **Kuanglin Chao,** Agricultural Research Service (United States); **Ana Garrido-Varo,** Univ. de Córdoba (Spain); **Renfu Lu,** Agricultural Research Service (United States); **Yankun Peng,** China Agricultural Univ. (China); **Dolores Pérez-Marín,** Univ. de Córdoba (Spain); **Jianwei Qin,** Agricultural Research Service (United States); **J. Paul Robinson,** Purdue Univ. (United States); **Kouhyar Tavakolian,** Univ. of North Dakota (United States); **Paul J. Williams,** Department of Food Science, Stellenbosch Univ. (South Africa); **Haibo Yao,** Mississippi State Univ. (United States); **Seung-Chul Yoon,** Agricultural Research Service (United States)

Monday 14 April 2025

SESSION 1: AUTOMATED TECHNOLOGIES

14 April 2025 • 9:30 AM - 10:50 AM | Daytona 1, Ballroom Level
Session Chair(s): **Jianwei Qin**, Agricultural Research Service (United States)

13484-1 • 9:30 AM - 9:50 AM
Development and evaluation of a multispectral vision-based automated sweet potato sorting system
Author(s): **Jiajun Xu, Yuzhen Lu,** Michigan State Univ. (United States)

13484-3 • 9:50 AM - 10:10 AM
Preliminary development of a new multispectral vision-based, automated apple grading system towards in-orchard fruit sorting
Author(s): **Yuzhen Lu, Yuyuan Tian,** Michigan State Univ. (United States)

13484-4 • 10:10 AM - 10:30 AM
3D computer vision-based, real-time full-surface reconstruction and volume estimation of apples
Author(s): **Jiaming Zhang**, **Yuyuan Tian**, **Jiajun Xu, Yuzhen Lu,** Michigan State Univ. (United States)

13484-5 • 10:30 AM - 10:50 AM
A smart automation platform for cultured meat advancement
Author(s): **Nicholas L. Grzelak**, **S. Andrew Gadsden, P. Ravi Selvaganapathy,** McMaster Univ. (Canada)

Coffee Break 10:50 AM - 11:20 AM

SESSION 2: FOOD SAFETY AND QUALITY

14 April 2025 • 11:20 AM - 12:00 PM | Daytona 1, Ballroom Level
Session Chair(s): **Euiwon Bae**, Purdue Univ. (United States)

13484-8 • 11:20 AM - 11:40 AM
In-situ quality control of processed animal protein using portable NIR sensors
Author(s): **José Antonio Entrenas**, **Miguel Vega-Castellote**, **Jesús Galán**, **Mar Garrido-Cuevas**, **Irina Torres-Rodríguez** , **Ana Garrido-Varo, Dolores C. Pérez-Marín,** Univ. de Córdoba (Spain)

13484-9 • 11:40 AM - 12:00 PM
Study of the effect of packaging on determining the quality of Iberian ham using hyperspectral imaging
Author(s): **Irina Torres-Rodríguez** , **Miguel Vega-Castellote**, **José Antonio Entrenas**, **Jesús Galán, Dolores C. Pérez-Marín,** Univ. de Córdoba (Spain)

Lunch Break 12:00 PM - 1:30 PM

SESSION 3: HYPERSPECTRAL AND SPECTRAL IMAGING

14 April 2025 • 1:30 PM - 2:50 PM | Daytona 1, Ballroom Level
Session Chair(s): **Fartash Vasefi**, SafetySpect Inc. (United States)

13484-11 • 1:30 PM - 1:50 PM
Hyperspectral imaging technology coupled with a non-targeted control method for the detection of peanut fragments in chopped nuts
Author(s): **Miguel Vega-Castellote,** Univ. de Córdoba (Spain); **Moon S. Kim,** U.S. Dept. of Agriculture (United States); **María-Teresa Sánchez, Dolores C. Pérez-Marín,** Univ. de Córdoba (Spain)

13484-12 • 1:50 PM - 2:10 PM
Early detection of gray mold infection in cherry tomatoes using two hyperspectral imaging techniques
Author(s): **Haeun Kim, Byoung-Kwan Cho,** Chungnam National Univ. (Korea, Republic of)

13484-13 • 2:10 PM - 2:30 PM
Hyperspectral scattering imaging for assessing woody breast conditions in broiler breast fillets
Author(s): **Xinyang Mu**, **Yuzhen Lu, Jiaxu Cai,** Michigan State Univ. (United States)

13484-14 • 2:30 PM - 2:50 PM
Crop fertilization monitoring using drone VIS-NIR hyperspectral imaging
Author(s): **Sunghyuk Jang**, **Hyungjin Bae**, **Muhammad Fahri Reza Pahlawan, Byoung-Kwan Cho,** Chungnam National Univ. (Korea, Republic of)

Coffee Break 2:50 PM - 3:20 PM

SESSION 4: PORTABLE AND NIR SPECTROSCOPY

14 April 2025 • 3:20 PM - 4:40 PM | Daytona 1, Ballroom Level
Session Chair(s): **Insuck Baek**, Agricultural Research Service (United States)

13484-15 • 3:20 PM - 3:40 PM
Performance evaluation of a portable multimode spectroscopy device
Author(s): **Mar Garrido-Cuevas**, **José Antonio Entrenas-León**, **Miguel Vega-Castellote**, **Irina Torres-Rodríguez,** Univ. de Córdoba (Spain); **Fartash Vasefi,** SafetySpect Inc. (United States); **Dolores C. Pérez-Marín,** Univ. de Córdoba (Spain)

13484-16 • 3:40 PM - 4:00 PM
Freshness assessment of beef and lamb using handheld multimode spectroscopy and machine learning
Author(s): **Sayed Asaduzzaman**, **Shereen Ismail,** Univ. of North Dakota (United States); **Kasey Carlin**, **Erin Beyer**, **Travis Hoffman,** North Dakota State Univ. (United States); **Mitchell Sueker**, **Yasser Ahmed,** Univ. of North Dakota (United States); **Hamid Reza Marateb**, **Fartash Vasefi,** SafetySpect Inc. (United States); **Hossein Kashani Zadeh,** Univ. of North Dakota (United States)

13484-17 • 4:00 PM - 4:20 PM
A cost-effective approach to assess the organoleptic properties of virgin olive oils using a miniaturized portable NIR
Author(s): **Mar Garrido-Cuevas**, **Ana Garrido-Varo**, **María-Teresa Sánchez**, **Miguel Vega-Castellote, Dolores C. Pérez-Marín,** Univ. de Córdoba (Spain)

13484-19 • 4:20 PM - 4:40 PM
Dehydration analysis of vegetables under ambient conditions using a portable terahertz probe
Author(s): **Uzair Aalam**, **Aparajita Bandyopadhyay, Amartya Sengupta,** Indian Institute of Technology Delhi (India)

SYMPOSIUM PLENARY

14 April 2025 • 5:30 PM - 6:20 PM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-plenary

Chair welcome and introduction
14 April 2025 • 5:30 PM - 5:40 PM EDT

Bring the future faster (Plenary Presentation)
Presenter(s): Jason E. Bartolomei, Brigadier General, United States Air Force, Air Force Research Laboratory (United States)
14 April 2025 • 5:40 PM – 6:20 PM EDT

Tuesday 15 April 2025

SYMPOSIUM PANEL ON SPACE SENSING: EMERGING TOPICS, NEEDS, AND CROSSOVER TECHNOLOGY

15 April 2025 • 8:30 AM - 10:00 AM | Osceola Ballroom C, Ballroom Level

View Full Details: spie.org/dcs/symposium-panel

Crossover sensing and autonomy technologies are pushing satellite systems toward lower-cost, smaller, distributed architectures with shortened cycles in all areas. Join our illustrious panelists and moderator as we discuss emerging topics, needs, and crossover technology at this symposium-wide panel on space sensing.

Coffee/Exhibition Break 10:00 AM - 11:00 AM

SESSION 5: AI AND MACHINE LEARNING I

15 April 2025 • 11:00 AM - 12:20 PM | Daytona 1, Ballroom Level
Session Chair(s): **Moon S. Kim**, Agricultural Research Service (United States)

13484-20 • 11:00 AM - 11:20 AM
Soluble solid content prediction based on strawberry part characteristics using deep learning algorithm and hyperspectral imaging
Author(s): **Seungwoo Chun**, **Jeong-Eun Lee**, **Su Ho Tae,** Kangwon National Univ. (Korea, Republic of); **In-Geun Hwang,** FRUSEN (Korea, Republic of); **Jung Hyeon Lim,** Kangwon National Univ. (Korea, Republic of); **Insuk Baek,** Agricultural Research Service (United States); **Changyeun Mo,** Kangwon National Univ. (Korea, Republic of)

13484-21 • 11:20 AM - 11:40 AM
Multiclass citrus leaf disease inspection with region classification and hyperspectral imagery
Author(s): **Quentin Frederick**, **Thomas Burks**, **Zafar Iqbal**, **Satya Obellaneni,** Univ. of Florida (United States); **Jianwei Qin**, **Moon S. Kim,** Agricultural Research Service (United States); **Megan Dewdney**, **Adam Watson,** Univ. of Florida (United States); **Pappu Yadav,** South Dakota State Univ. (United States)

13484-22 • 11:40 AM - 12:00 PM
Deep learning model for maturity assessment of Korean melons using fluorescence hyperspectral imaging
Author(s): **Woo Hyeong Yu**, **Changyeun Mo**, **Hong Gu Lee,** Kangwon National Univ. (Korea, Republic of); **Moon S. Kim,** Agricultural Research Service (United States); **Ahyeong Lee,** National Institute of Agricultural Sciences (Korea, Republic of); **Ji Hye Choi,** Gyeongsangbuk-do Agricultural Research & Extension Services (Korea, Republic of)

13484-23 • 12:00 PM - 12:20 PM
Hyperspectral imaging and machine learning for soybean SDS severity classification
Author(s): **Md Zafar Iqbal**, **Thomas Burks,** Univ. of Florida (United States); **Pappu Yadav,** South Dakota State Univ. (United States); **Satya Obellaneni,** Univ. of Florida (United States); **Inayat Rasool**, **Ivan Perez Olivera**, **Rishik Aggarwal**, **Young Chang**, **Ali Mirzakhani Nafchi**, **Shyam Solanki**, **David Karki,** South Dakota State Univ. (United States); **Quentin Frederick,** Univ. of Florida (United States); **Jianwei Qin, Moon S. Kim,** Agricultural Research Service (United States)

Lunch/Exhibition Break 12:20 PM - 1:50 PM

SESSION 6: AI AND MACHINE LEARNING II

15 April 2025 • 1:50 PM - 3:20 PM | Daytona 1, Ballroom Level
Session Chair(s): **Seung-Chul Yoon**, Agricultural Research Service (United States)

13484-24 • 1:50 PM - 2:20 PM
Rapid AI-powered risk analytics and fluorescence-based handheld scanning: Preventing outbreaks to protect public health and reduce food waste *(Invited Paper)*
Author(s): **Fartash Vasefi, Kenneth Barton,** SafetySpect Inc. (United States)

13484-25 • 2:20 PM - 2:40 PM
Detecting E. coli concentration levels on various surfaces using UV-C fluorescence imaging and YOLO11 deep learning
Author(s): **Thomas Burks**, **Snehit Vaddi**, **Zafar Iqbal,** Univ. of Florida (United States); **Pappu Yadav,** South Dakota State Univ. (United States); **Jianwei Qin**, **Moon S. Kim,** Agricultural Research Service (United States); **Mark Ritenour,** Univ. of Florida (United States); **Fartash Vasefi,** SafetySpect Inc. (United States); **Jiuxu Zhang,** Univ. of Florida (United States)

13484-26 • 2:40 PM - 3:00 PM
Improved E. coli concentration levels detection on citrus leaf using CSI-D+ UV-C fluorescence imaging with customized YOLOv8 deep learning architecture
Author(s): **Thomas Burks**, **Snehit Vaddi**, **Zafar Iqbal,** Univ. of Florida (United States); **Pappu Yadav,** South Dakota State Univ. (United States); **Jianwei Qin**, **Moon S. Kim,** Agricultural Research Service (United States); **Mark Ritenour,** Univ. of Florida (United States); **Fartash Vasefi,** SafetySpect Inc. (United States); **Jiuxu Zhang,** Univ. of Florida (United States)

13484-27 • 3:00 PM - 3:20 PM
Federated learning-based outbreak risk assessment model with holistic data input and edge computing sensors for food processing facilities
Author(s): **Kouhyar Tavakolian,** Univ. of North Dakota (United States); **Dina Miqdadi**, **Kaylee Husarik**, **Hamed Taheri Gorji**, **Hamid Reza Marateb**, **Hossein Kashani Zadeh**, **Fartash Vasefi,** SafetySpect Inc. (United States); **Moon S. Kim,** Agricultural Research Service (United States)

Coffee Break 3:20 PM - 3:50 PM

SESSION 7: SPACE AGRICULTURE AND CROP HEALTH

15 April 2025 • 3:50 PM - 5:10 PM | Daytona 1, Ballroom Level
Session Chair(s): **Kouhyar Tavakolian**, Univ. of North Dakota (United States)

13484-29 • 3:50 PM - 4:10 PM
Multimodal BEiT-based diagnosis of plant drought stress for space agriculture using hyperspectral and fluorescence imaging
Author(s): **Hangi Kim**, **Eunsung Park,** Chungnam National Univ. (Korea, Republic of); **Moon S. Kim**, **Insuck Baek,** Agricultural Research Service (United States); **Aubrie E. O'Rourke,** NASA (United States); **Byoung-Kwan Cho,** Chungnam National Univ. (Korea, Republic of)

13484-30 • 4:10 PM - 4:30 PM
MoonLight: Plant health monitoring system for space crop production
Author(s): **Abdolrahim Zandi,** Univ. of North Dakota (United States); **Jianwei Qin**, **Diane E. Chan**, **Insuck Baek**, **Moon S. Kim,** Agricultural Research Service (United States); **Fartash Vasefi,** SafetySpect Inc. (United States); **Hossein Kashani Zadeh,** SafetySpect Inc. (United States), Univ. of North Dakota (United States); **Kouhyar Tavakolian,** Univ. of North Dakota (United States), SafetySpect Inc. (United States); **Pantea Tavakolian,** Univ. of North Dakota (United States)

13484-31 • 4:30 PM - 4:50 PM
Non-destructive assessment of drought stress in soybean plants using bio-speckle and hyperspectral imaging
Author(s): **Kim Juseung, Hoonsoo Lee,** Chungbuk National Univ. (Korea, Republic of)

13484-32 • 4:50 PM - 5:10 PM
Automated assessment of field-grown crop biotic stresses using AI approaches
Author(s): **Yufeng Zheng,** The Univ. of Mississippi Medical Ctr. (United States); **Erol Sarigul, Kwabena Agyepong,** Alcorn State Univ. (United States)

POSTER SESSION

15 April 2025 • 5:30 PM - 7:00 PM | Sun Room 4, Ballroom Level
Conference attendees are invited to attend the symposium-wide poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Poster authors will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster session.

Poster Setup: Tuesday 12:00 PM - 5:30 PM
Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/DCSPosterGuidelines.

13484-33 • 5:30 PM - 7:00 PM
Nondestructive detection of salbutamol in meat based on Raman spectral imaging
Author(s): **Yin Tianzhen**, **Yankun Peng,** China Agricultural Univ. (China); **Chao Kuanglin**, **Qin Jianwei, Tao Feifei,** U.S. Dept. of Agriculture (United States)

13484-34 • 5:30 PM - 7:00 PM
Improvement of detection and grading performance of apple quality intelligent robotic hand based on evolutionary algorithm and cloud
Author(s): **Yankun Peng**, **Zhenhao Ma**, **Bin Zhang, Yin Tianzhen,** China Agricultural Univ. (China)

13484-35 • 5:30 PM - 7:00 PM
Utilizing spectral imaging systems to identify invisible fecal contamination on chicken WOGs
Author(s): **M. Telah Black**, **Katherine S. Sierra**, **Luis Guzman,** Auburn Univ. (United States); **Aftab Siddique,** Fort Valley State Univ. (United States); **Vianca Tashiguano**, **Laura Garner**, **Amit Morey,** Auburn Univ. (United States); **Nicholas MacKinnon**, **Stanislav Sokolov**, **Fartash Vasefi,** SafetySpect Inc. (United States); **Jianwei Qin**, **Diane Chan**, **Insuck Baek**, **Kevin Chao, Moon S. Kim,** Agricultural Research Service (United States)

13484-36 • 5:30 PM - 7:00 PM
Sensing technologies for agricultural optimization: Trends in food quality and safety
Author(s): **Raveen Appuhamy,** McMaster Univ. (Canada); **Khaled Obaideen,** Univ. of Sharjah (United Arab Emirates); **Waleed Hilal,** McMaster Univ. (Canada); **Mohammad AlShabi,** Univ. of Sharjah (United Arab Emirates); **Stephen A. Gadsden,** McMaster Univ. (Canada)

13484-37 • 5:30 PM - 7:00 PM
Detection of drought stress in potato crops using multi-sensor imaging and lightweight deep learning
Author(s): **DongHwi Kwak**, **Kim Juseung,** Chungbuk National Univ. (Korea, Republic of); **Byoung-Kwan Cho,** Chungnam National Univ. (Korea, Republic of); **Woon-Ha Hwang,** Rural Development Administration (Korea, Republic of); **Hoonsoo Lee,** Chungbuk National Univ. (Korea, Republic of)

13484-38 • 5:30 PM - 7:00 PM
Machine learning-driven root plant phenotyping using imaging solution under microgravity condition
Author(s): **Hidayat Mohamad Soleh**, **Woosik Jeong**, **Taegil Lee, Geonwoo Kim,** Gyeongsang National Univ. (Korea, Republic of)

13484-39 • 5:30 PM - 7:00 PM
Detection of fungi in corn using fluorescence imaging equipment
Author(s): **Eunsoo Park**, **Sungyoun Kim,** National Agricultural Products Quality Management Service (Korea, Republic of); **Insuck Beak,** Agricultural Research Service (United States); **Jeehwa Hong**, **Jisook Song,** National Agricultural Products Quality Management Service (Korea, Republic of); **Moon S. Kim,** Agricultural Research Service (United States)

13484-40 • 5:30 PM - 7:00 PM
Configuration of space crop growth condition monitoring system using 3D LiDAR sensor
Author(s): **Eunsung Park,** Chungnam National Univ. (Korea, Republic of)

13484-41 • 5:30 PM - 7:00 PM
Early detection of biofilm formation on lettuce leaves using non-destructive spectroscopic methods
Author(s): **Seoyoung Kim, Byoung-Kwan Cho,** Chungnam National Univ. (Korea, Republic of)

13484-42 • 5:30 PM - 7:00 PM
Phenotype Analysis Algorithm According to Nutrient Imbalance in Indoor Farming
Author(s): **Se-Hun Jang, Byoung-Kwan Cho,** Chungnam National Univ. (Korea, Republic of)

13484-43 • 5:30 PM - 7:00 PM
Development of rapid fuel moisture content measurement model in forests based on hyperspectral imaging
Author(s): **Hong-Gu Lee,** Kangwon National Univ. (Korea, Republic of); **Kangjin Lee,** National Institute of Agricultural Sciences (Korea, Republic of); **Seung-Woo Chun**, **Jeong Yong Shin, Changyeun Mo,** Kangwon National Univ. (Korea, Republic of)

13484-45 • 5:30 PM - 7:00 PM
Capillary magneto-hydrodynamic pump for space crop irrigation
Author(s): **Abdolrahim Zandi**, **Hossein Kashani Zadeh**, **Kouhyar Tavakolian, Pantea Tavakolian,**Univ. of North Dakota (United States)

13484-46 • 5:30 PM - 7:00 PM
Novel multimode spectroscopy handheld system for realtime abiotic plant stress evaluation
Author(s): **Abdolrahim Zandi,** Univ. of North Dakota (United States), SafetySpect Inc. (United States); **Hossein Kashani Zadeh,** Univ. of North Dakota (United States); **Seyedali Hosseinirad,** SafetySpect Inc. (United States); **Kouhyar Tavakolian,** Univ. of North Dakota (United States); **Insuck Baek**, **Moon S. Kim,** Agricultural Research Service (United States); **Fartash Vasefi,** SafetySpect Inc. (United States); **Pantea Tavakolian,** Univ. of North Dakota (United States)

13484-47 • 5:30 PM - 7:00 PM
Multispectral fluorescence imaging systems to detect and deactivate biofilm in-situ
Author(s): **Benjamin Hu,** Univ. of North Dakota (United States); **Seyedali Hosseinirad,** SafetySpect Inc. (United States); **Ashley Boomer,** Agricultural Research Service, U.S. Dept. of Agriculture (United States); **Mahsa Aliee,** SafetySpect Inc. (United States), Univ. of North Dakota (United States); **Insuck Baek**, **Jianwei Qin**, **Moon S. Kim,** Agricultural Research Service (United States); **Fartash Vasefi,** SafetySpect Inc. (United States); **Hossein Kashani Zadeh,** SafetySpect Inc. (United States), Univ. of North Dakota (United States); **Jitendra Patel,** Agricultural Research Service (United States)

13484-48 • 5:30 PM - 7:00 PM
FISH-SPEC: Fast identification system for handheld spectroscopy and species classification
Author(s): **Mitchell Sueker,** Univ. of North Dakota (United States); **Nicholas MacKinnon**, **Gregory Bearman,** SafetySpect Inc. (United States); **Amanda Tabb**, **Diane Kim**, **Rosalee S. Hellberg,** Chapman Univ. (United States); **Alireza Akhbardeh**, **Hamid Reza Marateb,** SafetySpect Inc. (United States); **Jianwei Qin**, **Moon S. Kim,** Agricultural Research Service (United States); **Fartash Vasefi,** SafetySpect Inc. (United States); **Hossein Kashani Zadeh,** Univ. of North Dakota (United States), SafetySpect Inc. (United States)

13484-49 • 5:30 PM - 7:00 PM
Ultraviolet C inactivation of salmonella enteritidis in raw chicken juice on food contact surfaces using the contamination sanitization inspection and disinfection (CSI-D+) device
Author(s): **Ghana Tirpude**, **Grace Cho,** Chapman Univ. (United States); **JoAnn S. Van Kessel**, **Jakeitha L. Sonnier**, **Bradd Haley**, **Jianwei Qin**, **Moon S. Kim,** U.S. Dept. of Agriculture (United States); **Fartash Vasefi**, **Stanislav Sokolov,** SafetySpect Inc. (United States); **Rosalee Hellberg,** Chapman Univ. (United States)

13484-51 • 5:30 PM - 7:00 PM
UV fluorescence imaging:a novel alternative to ATP testing for surface cleanliness assessment in food and healthcare facilities
Author(s): **Kaylee Husarik,** SafetySpect Inc. (United States); **Mahsa Ailee**, **Phillip Lien,** SafetySpect Inc. (United States), Univ. of North Dakota (United States); **Jianwei Qin**, **Diane E. Chan**, **Insuck Baek**, **Moon S. Kim,** Agricultural Research Service (United States); **Stanislav Sokolov,** SafetySpect Inc. (United States); **Kouhyar Tavakolian,** Univ. of North Dakota (United States); **Jeffrey Murrow, Fartash Vasefi,** SafetySpect Inc. (United States)

13484-65 • 5:30 PM - 7:00 PM
Sensitivity enhancement of lateral flow assay utilizing laser thermospeckle effect
Author(s): **Jully Blackshare**, **Hansel A. Mina**, **Amanda Deering**, **Bartek Rajwa**, **J. Paul Robinson, Euiwon Bae,** Purdue Univ. (United States)

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Identification requirement

To verify registered participants and provide a measure of security, SPIE will ask attendees to present a government-issued photo identification at registration to collect registration materials. Individuals are not allowed to pick up badges for other attendees. Further, attendees may not have some other person participate in their place at any conference-related activity. Such other individuals will be required to register on their own behalf to participate.

For online events, SPIE requires individuals to register with their legal identity.

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SPIE events are subject to the applicable laser safety rules and regulations of the host location. SPIE supplies industry-standard Class 2 presentation laser pointers for all conference and other meeting rooms. For safety reasons, SPIE requests that presenters use provided laser pointers. The use of a personal laser pointer represents the user's acceptance of liability for any damage or injuries to the presenter or others.

No smoking policy

Attendees will observe all non-smoking regulations that are publicly posted by the facilities used by the event.

Online commenting policy

SPIE moderates all comments posted in an online event. We encourage robust discussion, the exchange of scientific ideas, and the sharing of multiple, diverse perspectives. We expect the discussion to be consistent with the norms of scholarly research community interactions at events. Online event participants should report any comments or content that falls short of those community norms. We will remove comments, content, or people that are considered inappropriate by SPIE standards or that:

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- upload viruses or are a cybersecurity hazard
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- are in violation of any applicable laws or regulations

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Registrations must be fully paid before access to the conference is allowed. SPIE accepts VISA, MasterCard, American Express, Discover, Diner's Club, checks, and wire transfers. Onsite registrations can also be paid with cash.

Recording policy

Conferences and poster sessions: audio and video recordings are prohibited without prior written consent of SPIE and the presenter. Consent forms are available at Speaker Check-in, SPIE Registration, or the Chair Services Desk. Individuals not complying with this policy will be asked to surrender their recording media and leave the conference room. Refusal to comply with such requests is grounds for expulsion from the event. Please see the SPIE code of conduct.

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