



## Synthetic Data for Artificial Intelligence and Machine Learning: Tools, Techniques, and Applications III (DS112)

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

*Conference Co-Chair:* **Celso De Melo**, DEVCOM Army Research Lab. (United States)

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Our conference seeks to grow the Synthetic Data community and foster connections across use cases, methods, and disciplines. By sharing our work in one place, we find common learning opportunities and work to advance the state of the art across the many touchpoints that synthetic data can impact across commercial and defense applications. We aim to facilitate the development of tools and processes for generating Synthetic Data and the dissemination of meaningful, evidence-based guidance for its use.

Conference topics include:

- RADAR/SAR
- search, detection and classification
- satellite-based reconnaissance
- hardware/software/human in the loop
- command and control environments
- biomedical applications
- autonomous navigation, driving, and piloting
- pose and gesture recognition
- multi-modal and non-image AI/ML
- data engineering and curation
- domain adaptation
- integrated machine learning and synthesis pipelines
- data quality metrics and visualization
- virtual asset creation and inverse graphics
- synthetic data generation tools.

### PANEL SESSION

#### Title: Deception and Trust in the Age of Synthetic Data

**Description:** A panel of academic and government experts will discuss deception and trust in AI and Machine Learning as synthetic data becomes more and more pervasive. Methods to detect, mitigate, and reject fake information are crucial to the modern age, while trust and reliability are paramount as AI/ML software and tools are more accessible than ever before. The panel will touch on the use of synthetic data to guard against deception and counter-AI attempts, improve transparency and trust in model outputs, and also what role synthetic data plays in disinformation and data poisoning

attempts. What can the community do to protect against unethical usage, and where does the responsibility fall?

**Facilitator:** Dr. Kimberly Manser (C5ISR Center RTI)

### JOINT SESSIONS

This conference will hold joint sessions:

- Partner Conference: RADAR Sensor Technology

#### Joint Session Title: Synthetic Data for RADAR Sensor AI/ML

Please submit papers that touch on synthetic data generation for RADAR-based AiTR, Computer Vision, or other AI/ML applications, including data simulation, virtual assets, and tools.

- Partner Conference: Algorithms, Technologies, and Applications of Multispectral and Hyperspectral Imaging

#### Joint Session Title: Synthetic Data for Multispectral and Hyperspectral Imaging

Please submit papers that touch on synthetic data generation for multispectral or hyperspectral imagery AI/ML applications, including virtual assets and components, simulation tools, and use case evaluation.

- Partner Conference: Infrared Technologies and Applications and Automatic Target Recognition

#### Joint Session Title: Synthetic Data for Infrared Automatic Target Recognition

Please submit papers that touch on synthetic infrared (IR) image simulation or generation for AI and deep learning, ATR-based applications. This includes virtual assets, tools, and use case evaluation of synthetic data for IR applications and A(i)TR.

### AWARDS

We are pleased to announce two awards for this conference:

- Best Oral Presentation Award: presentations will be evaluated in terms of scientific content, audience accessibility, and quality of visual aids
- Best Poster Award: posters will be evaluated in terms of scientific content, audience accessibility, and quality of visual aids.

Award winners will receive an awards certificate. All accepted presentations in this conference are automatically eligible.

# ABSTRACT SUBMISSION GUIDELINES

## Present your research at SPIE Defense + Commercial Sensing

Below are abstract submission instructions, the accompanying submission agreement, conference presentation guidelines, and guidelines for publishing in the Proceedings of SPIE on the SPIE Digital Library. Submissions subject to chair approval.

### Important dates

|                                                          |                  |
|----------------------------------------------------------|------------------|
| Abstracts due                                            | 2 October 2024   |
| Registration opens                                       | December 2024    |
| Authors notified and program posted online               | 30 December 2024 |
| Submission system opens for manuscripts and poster PDFs* | 10 February 2025 |
| Poster PDFs due for spie.org preview and publication     | 19 March 2025    |
| Manuscripts due                                          | 26 March 2025    |
| Advance upload deadline for oral presentation slides**   | 11 April 2025    |

\*Contact author or speaker must register prior to uploading

\*\*After this date slides must be uploaded onsite at Speaker Check-in

### What you will need to submit

- Title
- Author(s) information
- Speaker biography (1000-character max including spaces)
- Abstract for technical review (200-300 words; text only)
- Summary of abstract for display in the program (50-150 words; text only)
- Keywords used in search for your paper (optional)
- Check the individual conference call for papers for additional requirements (i.e., special abstract requirements or instructions for award competitions)

Note: Only original material should be submitted. Commercial papers, papers with no new research/development content, and papers with proprietary restrictions will not be accepted for presentation.

### How to submit your abstract

- Visit the conference page: [www.spie.org/DS112call](http://www.spie.org/DS112call)
- You may submit more than one abstract but submit each abstract only once.
- Click the "Submit An Abstract" button on the conference page.
- Sign in to your SPIE account or create an account if you do not already have one.
- Follow the steps in the submission wizard until the submission process is completed.

If your submission is related to an application track below, indicate the appropriate track when prompted during the submission process.

### Application tracks

An application track is a grouping of presentations on a topic of interest across all conferences. During submission of the abstract, the submitting author should select an application track if it is relevant to their research.

**AI/ML:** Papers that showcase the use of artificial intelligence, machine learning, and deep learning to create and implement intelligent systems

**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

**Sustainability:** 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.

### Submission agreement

All presenting authors, including keynote, invited, oral, and poster presenters, agree to the following conditions by submitting an abstract:

- Register and pay the conference registration fee
- Agree to receive email messaging for the conference series
- Oral presenters: agree to recording and publication of your onsite presentation (slides synched with voice) in the Proceedings of SPIE in the SPIE Digital Library
- Poster presenters: one person may not present more than two posters in a poster session; submit a poster PDF for preview in the online program (web and app) and for publication in the Proceedings of SPIE in the SPIE Digital Library

- Submit a manuscript by the advertised due date for publication in the Proceedings of SPIE in the SPIE Digital Library
- Obtain funding for registration fees, travel, and accommodations
- Attend the meeting
- Present at the scheduled time

### Review and program placement

- To ensure a high-quality conference, all submissions will be assessed by the conference chair/editor for technical merit and suitability of content
- Conference chairs/editors and/or SPIE staff reserve the right to reject for presentation any paper that does not meet content or presentation expectations
- Final placement in an oral or poster session is subject to chair discretion

### Publication of Proceedings in the SPIE Digital Library

Increase your professional visibility and publish in the world's largest collection of optics and photonics research. Your peers access approximately 18 million papers, presentations, and posters from the SPIE Digital Library each year.

- Only manuscripts, presentations, and posters presented at the conference and received according to publication guidelines and due dates will be published in the Proceedings of SPIE in the SPIE Digital Library
- Manuscripts, presentations, and posters will be officially published after the event in the SPIE Digital Library
- Conference chairs/editors or SPIE staff may require revision before approving publication and reserve the right to reject for publication any manuscript or presentation that does not meet acceptable standards for a scientific publication
- Conference chair/editor and/or SPIE staff decision to accept or reject a manuscript, presentation, or poster for publication is final
- Authors must be authorized to provide a suitable publication license to SPIE; authors retain copyright of all scientific material
- SPIE retains rights to distribute and market the official SPIE recording of the presentation and/or submitted poster
- SPIE partners with relevant scientific databases and indexes to enable researchers to easily find papers published in the Proceedings of SPIE. The databases that abstract and index these papers include Astrophysical Data System (ADS), Ei Compendex, CrossRef, Google Scholar, Inspec, Scopus, and Web of Science
- More publication information available on the [SPIE Digital Library](http://www.spie.org/digital-library).

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#### QUESTIONS?

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For questions about your presentation, submitting an abstract, or the meeting, contact your conference program coordinator.

For questions about publication or the SPIE Digital Library, contact your proceedings coordinator.