Algorithms for Synthetic Aperture Radar Imagery XXX (DCS108)

Conference Chairs: 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); Don Lahiri Nirmal M. Hetliarachchi, Univ. of Dayton (United States); Eric R. Keydel, Leidos, Inc. (United States); Juan Li, Univ. of Central Florida (United States); Uttam Kumar Majumder, Air Force Research Lab. (United States); Michael J. Minardi, Air Force Research Lab. (United States); Randolph L. Moses, The Ohio State Univ. (United States); Les Novak, Scientific Systems Co., Inc. (United States); Christopher Paulson, Air Force Research Lab. (United States); Lee C. Potter, The Ohio State Univ. (United States); Brian Rigling, Wright State Univ. (United States); Timothy D. Ross, Leidos, Inc. (United States)

Synthetic aperture RADAR research is advancing in several key application areas:

• SAR target discrimination and classification algorithms and characterization of performance tradeoffs
• moving target (vehicles, dismounts) detection, tracking, imaging, and classification exploiting the long integration times provided by SAR based MTI
• video SAR for continuous surveillance
• image compression for large area coverage and video SAR streams
• ground, foliage, and building penetration
• advanced detection algorithms including coherent and non-coherent change detection for finding difficult targets (e.g., targets deployed under tree cover, camouflage, etc.) and for discriminating decoys
• 3D reconstruction and geolocation.

These enhancements are enabled by significant advancements in 2D and 3D imaging which are, in turn, driven by the incorporation of diversity into the imaging process. These diversities include: wide angle, polarization, waveform, frequency (e.g., Ka, Ku, X, L, UHF, VHF), and aperture (interferometric, MIMO, multi-static, passive sensing, and multi-pass sensing).

Of particular interest and importance is the application of machine learning (e.g., deep learning) approaches to these important problems. These very promising approaches are still in development and have the following challenges:

• using machine learning with relatively small amounts of measured data for training including the generation and use of synthetic data
• developing deep learning approaches that are robust, particularly when the conditions of the training and testing are mismatched
• developing deep learning approaches that are self-aware of their performance (e.g., providing full posteriors conditioned on target, sensor, and environment states)
• understanding the technical basis of a deep learning algorithm decision or estimate.

We strongly encourage papers to address these key challenges in applying machine learning to SAR applications and problems.

CONTEXT AND REPRODUCIBILITY
In order to provide context for technical contributions and enhance the reproducibility of results, authors are urged to explicitly characterize and state assumed models and model parameters/operating conditions affecting performance evaluations or simulations.

BEST STUDENT PAPER AWARD
In order to be considered for this award, the student must be the presenter and the primary author, and marked as student and presenter in the submission system. A panel of experts will evaluate the papers, both for quality and content with regard to: 1) innovation, clarity, and style, and 2) the importance of the work to the field.
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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.

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| Submission system opens for manuscripts and poster PDFs* | 27 February 2023 | **
| Poster PDFs due for spie.org preview and publication | 5 April 2023 |  |
| Manuscripts due | 12 April 2023 |  |
| Advance upload deadline for oral presentation slides** | 28 April 2023 |  |

*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
- 250-word abstract for technical review
- 100-word summary for the program
- Keywords used in search for your paper (optional)
- Check the individual conference call for papers for additional requirements (for example, some conferences require two- to three-page extended summary for technical review, or have 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/DCS108call
- 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**
- AI/ML: Papers that showcase the use of artificial intelligence, machine learning, and deep learning to create and implement intelligent systems
- Net Zero: Papers that feature solutions to achieving net zero energy consumption, waste, and carbon emissions within optics and photonics

**Submission agreement**
- Agree to the following conditions by submitting an abstract:
  - 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 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

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