

# 2024 第七届 IEEE 国际无人系统大会 特邀专题简介表

## 特邀专题名称

多模态遥感图像的智能安全可信处理

## 组织者

1. 蒋雯，教授，西北工业大学
2. 耿杰，副教授，西北工业大学
3. 邓鑫洋，副教授，西北工业大学

## 个人简介



**蒋雯**，西北工业大学教授，博士生导师，国家级领军人才，空天电子信息感知与光电控制教育部重点实验室副主任，中国指挥与控制学会理事、信息融合专委会副主任委员、多域态势感知与认知专委会常务委员、指挥与控制网络专委会常务委员，出版学术专著 3 部，授权发明专利 35 项，第一或通讯作者发表 SCI 论文 80 余篇，第一完成人获中国指挥与控制学会科技进步一等奖、国防科技进步二等奖和陕西省科学技术二等奖各一项，入选 2020、2021 年科睿唯安“全球高被引科学家”。



**耿杰**，西北工业大学副教授，CICC 青工委委员。长期致力于 SAR 微波遥感、人工智能、多源信息融合等领域科研工作。在 IEEE Transactions on Geoscience and Remote Sensing、ISPRS Journal of Photogrammetry and Remote Sensing、IEEE Transactions on Circuits and Systems for Video Technology、自动化学报等国内外高水平期刊发表 30 余篇论文，授权发明专利 10 余项。主持或参与国家自然科学基金、国家重点研发计划、陕西省重点研发计划项目等国家和省部级项目 10 余项。



**邓鑫洋**，西北工业大学副教授，博士生导师，CICC 青工委委员、信息融合专委会委员。从事智能算法安全、多源信息融合等领域研究，近年来先后主持或参与国家自然科学基金、国家科技重大专项等国家和省部级项目十余项，以第一作者或通讯作者身份发表学术论文 50 余篇，出版学术专著 3 部，申请国家发明专利 30 余项，获中国指挥与控制学会科技进步一等奖、国防科学技术进步二等奖、陕西省科学技术二等奖等奖励，入选科睿唯安全球高被引科学家。

### 特邀专题简介

随着人工智能技术的飞速发展，深度学习等人工智能算法在多模态遥感图像解译任务中得到广泛应用，成为遥感图像解译的重要手段。实际遥感探测面临数据模态多、背景复杂、场景幅宽大等问题，而且人工标注样本有限，给遥感图像智能解译带来诸多挑战，研究小样本目标识别、跨域迁移学习、多模态图像融合识别等模型，提升复杂场景下的遥感图像智能解译精度。同时，考虑到深度神经网络的黑盒特性，基于深度学习的遥感图像智能解译模型的可解释性和可靠性不足，智能解译模型容易受到对抗样本攻击、数据投毒攻击、逆向攻击等安全威胁，研究遥感图像智能解译的安全可信方法，提升实际场景中遥感智能解译算法的可信性、可靠性与安全性。

本特邀专题邀请以下与“多模态遥感图像的智能安全可信处理”主题相关的包含创新思想、概念、新发现、改进以及新应用的原创论文。

- 遥感图像目标检测识别
- 遥感图像跨域迁移学习
- 多模态遥感图像融合
- 遥感图像智能模型的攻击与防御
- 遥感图像智能模型的可信性
- 遥感图像智能模型的安全性

# IEEE ICUS 2024

## Invited Session Summary

### Title of Session

Intelligent Secure and Trustworthy Processing of Multimodal Remote Sensing Images

### Organizers

#### 1. Prof. Wen Jiang

Northwestern Polytechnical University, China

#### 2. Dr. Jie Geng

Northwestern Polytechnical University, China

#### 3. Dr. Xinyang Deng

Northwestern Polytechnical University, China

### Biosketches of Organizers



**Wen Jiang**, Professor at Northwestern Polytechnical University, Doctoral Supervisor, National Leading Talent. She serves as the Deputy Director of the Key Laboratory of Aerospace Electronic Information Perception and Optoelectronic Control of the Ministry of Education, the Director of the Chinese Institute of Command and Control (CICC), Vice Chairman of the Information Fusion Committee, Executive Member of the Command and Control Network Committee, and the

Member of the Information Fusion Branch of Chinese Society of Aeronautics and Astronautics. She mainly engaged in research on information fusion, uncertain artificial intelligence, and intelligent algorithm security. She has published three academic monographs and authorized 35 invention patents, and over 80 SCI papers, of which 20 have been selected as highly cited or hot topic papers in ESI. As the first completed person, she has won the first prize of CICC Science and Technology Progress Award, the second prize of National Defense Science and Technology Progress Award, and the second prize of Shaanxi Province Science and Technology Award. She was selected as a "Highly Cited Researchers" by Clarivate in 2020 and 2021.



**Jie Geng**, Associate Professor at Northwestern Polytechnical University, and Member of the CICC Youth Working Committee. He mainly engaged in research on SAR microwave remote sensing, artificial intelligence, and multi-source information fusion. He has published more than 30 papers in high-level domestic and international journals such as IEEE Transactions on Geoscience and Remote Sensing, ISPRS Journal of Photography and Remote Sensing, IEEE Transactions on Circuits and Systems for Video Technology, Journal of Automation, and more than 10 authorized invention patents. He has hosted or participated in more than 10 national and provincial level projects, including the National Natural Science Foundation of China, the National Key Research and Development Program, and the Shaanxi Provincial Key Research and Development Program.



**Xinyang Deng**, Associate Professor at Northwestern Polytechnical University, Doctoral Supervisor, and Members of CICC Youth Working Committee, CICC Information Fusion Committee. His research areas include intelligent algorithms security, multi-source information fusion and so on. He has hosted or participated more than 10 national and provincial level projects including National Natural Science Foundation of China and National Science and Technology Major Project, and published 3 academic monographs and more than 50 academic papers, authorized over 30 invention patents. He has won the first prize of CICC Science and Technology Progress Award, the second prize of National Defense Science and Technology Progress Award, second prize of Shaanxi Province Science and Technology Award, and selected as a "Highly Cited Researchers" by Clarivate.

### **Details of Session**

With the rapid development of artificial intelligence technology, deep learning based intelligence algorithms have been widely developed in multimodal remote sensing interpretation tasks, which have been an important method for remote sensing image interpretation. Actual remote sensing faces the issues of various data modes, complex background and large scene, and manual labeling samples are limited, which brings many challenges to intelligent interpretation of remote sensing images. Models including few-shot target recognition, cross-domain transfer

learning, multimodal image fusion recognition have been studied to improve the effectiveness of remote sensing image interpretation in complex scenes. At the same time, considering the black-box characteristics of deep neural network, the interpretation and reliability of deep interpretation models for remote sensing images are insufficient. Artificial intelligence models are vulnerable to security threats such as anti-sample attack, data poisoning attack and reverse attack. The interpretation and reliability of deep models for remote sensing images should be studied to improve the credibility and security of intelligent interpretation algorithms for remote sensing in actual scenes.

The invited session invites original papers of innovative ideas and concepts, new discoveries and improvements, and novel applications relevant to the following selected topics of “Intelligent Secure and Trustworthy Processing of Multimodal Remote Sensing Images”.

- Remote Sensing Image Target Detection
- Cross-Domain Transfer Learning of Remote Sensing Image
- Multimodal Remote Sensing Image Fusion
- Attack and Defense for Remote Sensing Image Intelligent Interpretation
- Interpretability for Remote Sensing Image Intelligent Interpretation
- Security for Remote Sensing Image Intelligent Interpretation