

## **Special Issue: Advanced detection and imaging techniques for complex environment**

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### **Introduction to the Special Issue:**

Digital focal planes, integrated optical techniques and, most recently, real-time neural processing are revolutionizing optical imaging. Emerging imaging systems enable new scenarios with higher optical detection and imaging requirements, spanning microscale dimensions and macroscale dimensions. For example, in typhoon detection, current foundation detection methods face difficulties in adapting to the dynamic changes in typhoon tracks and cannot meet the requirements for in-situ quantitative observations. While conventional optical imaging techniques fail to reach physical limits in these scenarios, the combination of more detailed physical models and more sophisticated data science enable multiple order of magnitude improvements. To this end, interdisciplinary research is imperative to promote innovations in electronics, materials, optics and computing, which develop novel techniques such as computational imaging and computational sensing. These techniques enable acquisition of multi-dimensional and multiscale information in complex environments, and facilitate their latent applications in major projects.

This special issue aims to discuss the cutting-edge advances in the field of advanced detection and imaging techniques for complex environments, including but not limited to computational imaging and sensing, multi-model imaging, cooperative detection, biomedical imaging and diagnosis. We hope to provide an overview as well as insightful perspectives of the field by collecting contributions from leading experts and major industry players to promote scientific breakthroughs and impactful applications in optical detection and imaging.

### **Guest editors:**



**Prof. Jun Zhang, Beijing Institute of Technology, China**

Prof. Jun Zhang is an Academician of the Chinese Academy of Engineering, the CPC Party Secretary of Beijing Institute of Technology, and the Vice Chairman of the Chinese Institute

of Electronics. Prof. Zhang's major research interests are integrated space-air-ground network, aeronautical navigation and surveillance, and air traffic management.



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Prof. David Brady is the J. W. and H. M. Goodman Professor of Optical Sciences at the University of Arizona. Brady is a Fellow of SPIE, Optica and IEEE. He received the 2013 SPIE Denis Gabor Award and the 2023 Optica Emmett Leith award for his work on compressive holography. Brady led the team that built the world's first gigapixel camera. He is the author of the text "Optical Imaging and Spectroscopy."



**Prof. Liheng Bian, Beijing Institute of Technology, China**

Prof. Liheng Bian is a Professor with Beijing Institute of Technology. His research interests include computational imaging and computational sensing. He has published a monograph of Computational Imaging and Sensing, and over 50 peer-reviewed papers on Light: Science & Applications, eLight, ACS Photonics and so on.

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