

## **Applications of Machine Learning and Artificial Intelligence in Coherent Scatter Imaging: A Task-Specific Approach**

### **Abstract:**

To address critical challenges in aviation security and medical imaging, Quadridox has developed advanced X-ray diffraction imaging techniques that enable the evaluation of entire regions in objects or specimens. In aviation security, the goal is to detect threats concealed within luggage, while in medical imaging, the focus is on identifying disease. Despite their distinct applications, both fields share a common challenge: discriminating between regions of interest and irrelevant background material. In this talk, I will present our computational imaging approach for generating spatially-resolved coherent scatter measurements to classify materials and tissue in these domains. I will discuss how we integrate machine learning (ML) and artificial intelligence (AI) to enhance system performance, optimize data interpretation, and improve detection accuracy.