Remote Sensing of Land Deformation and Early Warning of Geo-hazards for Sustainable Development

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Global urbanization has created a huge demand for civil infrastructures, such as buildings, subways, bridges, dams, highways, airports, and railroads. Unfortunately, land subsidence and structural deformations under the combined effects of natural and anthropogenic activities are threatening infrastructural health and public safety. Like human's health conditions, infrastructural health should also be monitored regularly to build a safe and resilient city. In this seminar, I will discuss my work on the development and application of innovative radar remote sensing methods with deep learning analytics for monitoring large-scale land deformations and studying their interactions with environmental factors. Two important scientific issues will be specifically addressed. For one thing, I will discuss how to accurately monitor land deformations and intelligently mine their spatio-temporal patterns in various geological, hydrological, meteorological and built environments through multi-source big data analytics. For another, I will focus on revealing the interactions between land deformations and environmental factors and identifying risk indicators for early warning by integrating data-driven and model-driven methods. I will highlight how my research advances fundamental scientific knowledge of large-scale infrastructural dynamics and their relationship with specific environmental factors and how it strongly supports the United Nations Sustainable Development Goals and CUHK's Strategic Plan 2021–2025.

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Peifeng Ma is a research assistant professor at the Institute of Space and Earth Information Science of The Chinese University of Hong Kong. His research interests include remote sensing, geospatial big data analytics, land deformation monitoring, and sustainable development. Dr Ma has published more than 30 articles in high-impact peer-reviewed journals. He has received six research grants as PI/PC from highly competitive sources, including the Research Grants Council of Hong Kong, the National Natural Science Foundation of China, and the Innovation and Technology Fund. He is the chief designer of the Golden Bauhinia satellite application system and holds six invention patents. He has won several prestigious awards, such as the AXA Post-Doctoral Fellowship and the Young Talent Award from the National Remote Sensing Centre of China.

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