

# RESEARCH SEMINAR

DEPARTMENT OF GEOGRAPHY AND RESOURCE MANAGEMENT  
THE CHINESE UNIVERSITY OF HONG KONG

## Enable deep learning to harvest Landsat's half-century collection for land cover mapping

4 Oct 2023 (Wed)

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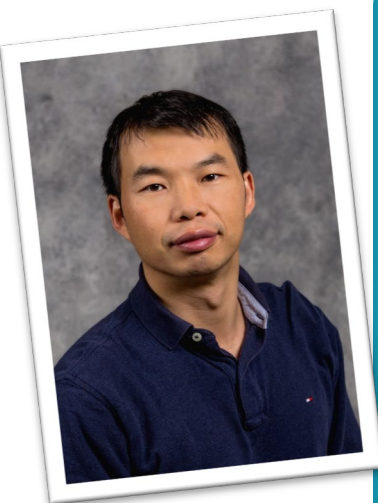
Deep learning has been widely used for small area land cover mapping using single high spatial resolution (<5 m spatial resolution) images by exploring pixel spatial correlation. However, continental or global land cover maps are produced using time series medium spatial resolution (e.g., 30 m Landsat) data to take advantage of the inter-class differences in spectral changes over time. This is challenging as the Landsat time series is irregular with different time series lengths and acquisition dates across space and time and because of the computational needs of the large volume Landsat archive. This study presents a method to handle these issues and demonstrates the method to classify land cover over the continental United States (CONUS) for years 1985, 2006 and 2018. The method directly classifies the raw irregular time series (CRIT) using the state-of-the-art Transformer model which is unique as compared to traditional methods to transform raw irregular data before fed into deep learning. The CRIT has better accuracy and is more computationally efficient. The CRIT application to remote sensing environmental surface parameter retrieval, such as aerosol optical depth, ecosystem carbon fluxes and soil moisture from, is discussed.

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Hankui K. Zhang is an Assistant Professor (since 2019) at the Geospatial Sciences Center of Excellence co-founded by the South Dakota State University (SDSU) and USGS Earth Resources Observation and Science (EROS) Center. He got his PhD degree from CUHK in 2013. His research focuses on making satellite data ready to use, land cover mapping, and deep learning applications. He has published >50 SCI papers that gained >4000 citations. He is a USGS-NASA Landsat science team member. His developed BRDF correction method has been adopted by NASA to produce Harmonized Landsat and Sentinel-2 (HLS) products.



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