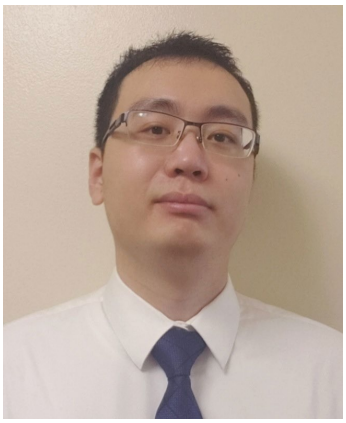

Bio: Yiqun Xie is an Assistant Professor in Geospatial Information Science at the University of Maryland. He received his PhD in Computer Science at the University of Minnesota, and his research addresses challenges facing machine learning and data mining for spatial data. His current work focuses on: (1) heterogeneity-aware learning in space, (2) knowledge/ physics-guided learning for data-sparse applications, and (3) fairness-aware learning for spatial data. His research is supported by NSF, NASA, Google and Amazon, and has received recognitions including the Best Paper Awards from IEEE ICDM 2021 and SSTD 2019, the Best Vision Paper Award from ACM SIGSPATIAL 2019, and highlights from the Great Innovative Ideas by CCC at CRA. Personal website: https://terpconnect.umd.edu/~xie/index.html

Title: Heterogeneity-Aware Deep Learning in Space: Performance and Fairness

Abstract: Spatial data are being collected at unprecedented scales and variety: the volume of remote sensing data is expected to grow to hundreds of petabytes by 2025, and the number of GPS receivers has surpassed 6-billion in 2021. At high resolutions, today's small satellites can already provide a scan of the entire Earth's surface on a daily basis. Such datasets provide timely information for decision making in smart cities and related resilience applications, such as public health, agriculture (e.g., food supply), extreme event response, etc. While machine learning is important for extracting information from such gigantic datasets, direct applications of these methods often fall short due to the unique challenges posed by spatial data. This talk will focus on the fundamental and common problem of spatial heterogeneity, where relationships between inputs (e.g., imagery) and prediction targets can vary largely by location. We will discuss two model-agnostic frameworks to address the challenge from two different perspectives: performance (e.g., F1 scores) and fairness. The talk will conclude with a brief discussion on other challenges and emerging opportunities.