

Abstract: In this talk, we will examine the population dynamics in Tokyo before and after the pandemics. Do considerable amounts of population in central Tokyo move to suburbs in the pandemic as we often hear in news reports? We have collected human population data from “NTT DoCoMo Spatial Statistics”, which provides human population within 1-km squares of pixels all over Japan every one hour. We focus on the data at 4:00am to examine the nighttime populations in Tokyo. Monthly averaging the daily panel, we obtain the monthly time series of 2400 pixels of human populations in Tokyo, which covers roughly areas within 50 km radius from Tokyo Station. Regarding the monthly panel as a surface time series, a discrete time observation of spatial valued functional data, we apply functional principal component analysis (fPCA) to examine populational features before and after the pandemic. We find that the tendency to avoid central Tokyo increased at the beginning of the pandemic, but it gradually decreased to reach the original level before the pandemic at the latest time point of Dec. 2023.