



# CoCo Seminar Series Spring 2025

## Spatio-Temporal Differences in Bike Sharing Usage: A Tale of Six Cities

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**Wednesday February 26, 2025 12:00-1:00pm EST  
Hybrid (EB-T1 & Zoom; meeting link available on  
<http://coco.binghamton.edu/>)**



This study investigates the spatio-temporal patterns of Bike Sharing System (BSS) usage in six major cities: New York, London, Tokyo, Boston, Chicago and Washington D.C. By analyzing data over a 30-day period with comparable climate and average temperatures, we explored differences in BSS usage between weekdays and weekends in those cities using Jensen-Shannon divergence (JSD) and rank distribution analysis. Our findings reveal significant temporal differences in BSS usage that were commonly observed in all cities, with weekday patterns dominated by commute peaks and weekend patterns reflecting recreational activities. Friday emerges as a transitional day, sharing the characteristics of both weekdays and weekends. Meanwhile, docking station usage rank distributions show remarkable consistency between weekdays and weekends for most cities, with London being a unique anomaly. This study highlights the potential of BSS data to uncover urban mobility patterns and the underlying structures of cities. The results suggest that BSS usage reflects both intrinsic user behavior and external influences such as urban planning.

Dr. Shu-ichi Kinoshita is a Professor in the Department of Mathematical Engineering at Musashino University, Tokyo, Japan, and a CoCo Visiting Scholar. He obtained his Ph.D. in Fundamental Energy Science from Niigata University, Japan, in 2009. He was a postdoctoral researcher at Meiji University, Tokyo, Japan, before joining Musashino University in 2014. His research interests include complex systems, statistical physics, dynamical networks, mathematical modeling, and their applications to biological and social problems.

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