



**27th TSU (Transport Studies Unit) Seminar**  
**Recent Advances in Network Macroscopic Fundamental**  
**Diagram Research**

Date: 23rd June (Fri.) 2017

Time: 16:00-17:30

Venue: Campus Innovation Center Tokyo (Tamachi Campus), Room 2, Second floor

Speaker:

Prof. Nikolas Geroliminis (Ecole Polytechnique Federale de Lausanne (EPFL))

Fee: Free

Abstract:

Creating realistic detailed models and control strategies for large-scale transportation systems remains a big challenge, due to the high unpredictability and heterogeneity of traveller decisions (in terms of route, time and mode of travel), the uncertainty in their reactions to control and the spatiotemporal propagation of congestion, and the lack of coordinated actions coupled with the limited infrastructure available. Instead of a detailed microscopic approach of traffic congestion, the macroscopic or network fundamental diagram (MFD or NFD) aims to simplify the complex task of the urban network modeling and consider the collective traffic flow dynamics of sub-networks to describe traffic operations at a network-wide level. This seminar will describe methodologies to model and understand the collective behavior for multi-modal and multi-region urban systems. It will highlight under what physical properties the aggregated laws will provide reasonable description of congestion through proper clustering and modeling techniques. Ultimately, the goal is to develop optimization tools and investigate what type of real-time active traffic management schemes (congestion pricing, vehicle restriction, large scale traffic signal control) can improve mobility measures in a city for cities of different structures. We build a hierarchical feedback control network of multiple levels. The validation of the modeling methodologies and the traffic management schemes are conducted in various and complex city structures scenarios using data from field experiments and micro-simulations.

## Short Bio:

Prof. Nikolas Geroliminis is an Associate Professor at EPFL and the head of the Urban Transport Systems Laboratory (LUTS). Before joining EPFL he was an Assistant Professor on the faculty of the Department of Civil Engineering at the University of Minnesota. He has a diploma in Civil Engineering from the National Technical University of Athens (NTUA) and a MSc and Ph.D. in civil engineering from University of California, Berkeley .He is a member of the Transportation Research Board's Traffic Flow Theory Committee. He is Associate Editor of Transportation Research, part C, Transportation Science and IEEE Transactions on ITS. He also serves in the editorial board of Transportation Research, part B and of many international conferences. His research interests focus primarily on urban transportation systems, traffic flow theory and control, public transportation and logistics, Optimization and Large Scale Networks. He is a recipient of the ERC Starting Grant “METAFERW: Modeling and controlling traffic congestion and propagation in large-scale urban multimodal networks”.

