

# July 2016 Complexity Community Sharing Session

14 Jul 2016 (Thur) 11:00am-01:00pm

Seminar Room 102

(opposite Learning Hub), Blk 1 Innovation Centre, Level 1  
16 Nanyang Drive, Singapore 637722

## *When Speculators Meet Constructors:*

### *Positive versus Negative Feedback in Experimental Housing Markets*



A/Prof. Te BAO

Te Bao and Cars Hommes

Asset markets are characterized by positive feedback through speculative demand. But housing markets distinguish themselves from other asset markets in that the supply of housing is endogenous, and adds negative feedback to the market. We design an experimental housing market and study how the strength of the negative feedback, i.e., the supply elasticity, affects market stability. In the absence of endogenous housing supply, the experimental housing markets exhibit large bubbles and crashes because speculators coordinate on trend-following expectations. When the positive feedback through speculative demand is offset by the negative feedback of elastic housing supply the market stabilizes and prices converge to fundamental value. Individual expectations and aggregate market outcome are well described by a behavioral heuristics switching model. Our results suggest that negative feedback policies may stabilize speculative asset bubbles.

**Biography:** Te Bao is an assistant professor of economics at the Division of Economics, Nanyang Technological University, Singapore. He obtained his Ph.D in Economics in 2012 from CeNDEF, University of Amsterdam. His research interest includes experimental economics, bounded rationality, behavioral finance and real estate economics. His works are published in *Economic Journal*, *European Economic Review*, *Journal of Economic Dynamics and Control*, *Real Estate Economics* and *Research in Experimental Economics*.

## *Classification of the Microscopic Deterministic Traffic Models and Empirical Verifications*



Dr. Yang Bo

We propose a universal framework for the construction of the microscopic traffic models from the acceleration patterns that can be verified via a "renormalization" like procedure from the microscopic empirical data. All microscopic traffic models in the literature can be treated as special cases under this general framework. To construct the exact model, we use image processing and machine learning techniques to extract microscopic vehicle dynamics data from the actual traffic flow in the expressways in Singapore. Such data include accelerations, velocities, headways and approach velocities. We aggregate the data by the proper sampling and averaging of the unimportant factors influencing the driving behaviours, and present several interesting features of the detailed driving behaviour, including the presence of a "synchronisation gap". We particularly discuss the controversy around the three-phase traffic theory and the related issues on traffic modelling. Our empirical results show strong evidence of the "synchronised phase", while at the same time the theoretical analysis indicates that the properly tuned two-phase models can in principle be treated as approximations of the more realistic three-phase traffic models. The necessity of incorporating the detailed driving behaviour (in particular the "synchronisation gap") for the capturing of well-known empirical features of the traffic flow is discussed using a special class of models as an example.

### **Biography:**

Dr. Yangbo is currently a scientist from IHPC - Complex Systems. He graduated with Ph.D Physics (Condensed Matter Theory) from Princeton University and B.Sc. Physics from Stanford University. His research interests are (1) Traffic Modeling and Optimization (2) Condensed matter and strongly correlated systems (3) Strongly Correlated systems and (4) Complex systems and non-linear dynamics.