In this talk, a new theoretical framework will be introduced to establish asymptotic distributions for conventional statistics, such as (partial) autocorrelation functions, for linear processes with dependent innovations (LPDI). In particular, we establish the invariance principle under mild conditions. Even for linear processes with iid innovations, we show invariance principle under weaker conditions on the linear filter than literature. The asymptotics are shown to be different from conventional ones. Consequently the conventional statistics are shown to give inconsistent inference results in model identification and model selection for such LPDI processes. In particular, we will illustrate that the widely used model selection criteria, such as AICc and AIC, fail to live up to their respective nice properties originally discovered in the context of classical time series with white noise innovations. We propose a modified model selection criteria and show its efficiency and robustness through simulations. The invariance principle is applied to certain spatial-temporal processes to identify a parsimonious representation adapted to local network structure. We will conclude with an example of real-time forecasting of network flow with composite periodicity and autoregressive conditional heteroscedastic pattern.

Speaker Biography

Dr. Wanli Min graduated from University of Science & Technology of China (USTC) with B.S degree in Physics. He holds Ph.D degree in Statistics from the University of Chicago and has been working in IBM research division since graduation. His research interests are asymptotics for stochastic process, time series analysis, signal processing and manifold learning.

Host: Prof Chee Yeow Meng, Head, Division of Mathematical Sciences, School of Physical and Mathematical Sciences