# Nonlinear time series analysis of industrial data with uncertainty
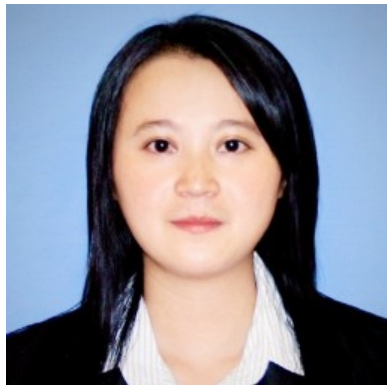
Dr Shuixiu Lu

Research Fellow

**Theme 2**

2023-08-18

**Virtual - Researchers Catch-up hosted online from University of WA**

Industrial data is often uncertain due to the difficulty in collecting critical measures, the noise contaminating measurements, or the underlying system with non-stationarity in which statistical properties change over time. These factors make accurate prediction and effective maintenance a challenging task. In addressing the challenge, a common assumption is that a stochastic process is responsible for uncertainty. Fitting data by stochastic systems is thus widely used to model uncertainty.

In this talk, Shuixiu will focus on data dynamics and show whether the data fitting is sufficient to model uncertainty. To achieve that, Shuixiu will exemplify time domain analysis of the data from a social system and present the difference between time domain analysis and frequency domain analysis to address uncertainty in engineered systems. Shuixiu will offer a method based on a reconstruction of the topology in data highlighting the importance of fitting the dynamics of data in the modelling of uncertainty.