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THE UNIVERSITY OF WARWICK

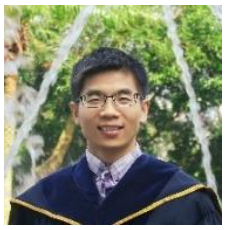
Civil Engineering Research Group

Invitation to Seminar

- **Bayesian Uncertainty Quantification & Propagation in System Identification for Structural Health Monitoring using Efficient Computing Strategies**

System identification based on ambient vibration responses has become a hot research topic in the field of structural health monitoring (SHM). In real applications, system identification is inevitably affected by multiple uncertainties such as measurement noise, etc.; therefore, it is of great significance to improve the robustness and accuracy of SHM results by properly accommodating these uncertainties. In this presentation, the issue of probabilistic modelling for frequency-domain ambient vibration responses is firstly investigated. Based on the analytical probabilistic model of frequency-domain responses, a two-stage fast Bayesian approach for operational modal analysis is proposed to address the variability in the identification of modal characteristics. The Bayesian structural model updating problem is then formulated by incorporating statistical modal properties corresponding to different setups. In this work, uncertainties are quantified and propagated through Bayesian computational tools such as asymptotic approximation and sampling algorithms. In particular, highly efficient computing strategies are proposed to reduce the excessive computational demands for Bayesian system identification. Field test data acquired from large-scale engineering structures subject to ambient vibration are processed to verify the robustness of the probabilistic model of frequency-domain responses and demonstrate the efficiency of operational modal analysis and structural model updating in a Bayesian framework.

Dr Wang-Ji Yan postdoctoral fellow, Civil Engineering, the University of Nottingham



Dr. Yan is currently a Marie Skłodowska-Curie Fellow at the University of Nottingham. He is also a Professor of civil engineering at Hefei University of Technology, China. Dr. Yan received his MSc in bridge engineering from Central South University, China in 2009, and his PhD in structural engineering from the Hong Kong University of Science & Technology, in 2013. In 2014, he joined Hefei University of Technology in China as a full Professor. His research focuses on signal processing, structural health monitoring and uncertainty quantification in structural dynamics. His research has led to over 40 publications in highly ranked journals and peer reviewed conference proceedings for which he received around 10 academic awards.

- **A laboratory study on wave overtopping at vertical seawalls with a shingle foreshore**

Current empirical predictions formulae for the estimation of overtopping characteristics are mainly based on the laboratory measurements. Since most of the parametric studies have been performed in the laboratory using a fixed impermeable beach, there may be an existence of uncertainties in the application of current empirical prediction methods to the vertical seawalls on a permeable shingle beach. The aim of this experimental study was to investigate the influence of permeable shingle beds in the overtopping characteristics at vertical walls, and to develop the design guidance for the estimation of wave overtopping at vertical walls with a shingle foreshore.

Mr Md Salauddin PhD student, Civil Engineering, the University of Warwick

Md Salauddin is a PhD researcher at the School of Engineering of the University of Warwick. He has been working as a Faculty member at the Faculty of Civil Engineering, Chittagong University of Engineering and Technology since 2013. Md's main research focus is in the field of coastal and ocean engineering, and he has a strong background in the physical modelling of coastal structures. He won the best paper award in the 3rd international conference on civil engineering for sustainable development held on 12th -14th February 2016 at Khulna, Bangladesh. His current project is 'wave hazards at coastal infrastructures'

Thursday 28 June 2018, 12.00pm-1:00pm

Room A401 Engineering Building

The seminar is open to all.
For more information, contact Dr Rezania (m.rezania@warwick.ac.uk).