**COLLOQUIUM**

Department of Computer Science and Engineering

University of South Carolina

**Event-Driven Modeling and Distributed Task Routing and Scheduling in Cyber Physical Material Handling Systems**

**Rong Su**

Date: **February 27, 2017**

Time: **9:30-10:45am**

Place: **Swearingen 1A03 (Faculty Lounge)**

# Abstract

We are at the dawn of the 4th industrial revolution - the era of the ICT backed Smart Manufacturing (or Industry 4.0). Among all challenges, the problem of how to model and manage efficiently the low volume high mixed (LVHM) manufacturing processes has been gaining more and more attentions from both academia and industry, owing to the rise of the maker/Do-It-Yourself (DIY) culture around the world. The major challenges in both modelling and operation planning are due to the complexity resulted from the scale and heterogeneity of the system, and the sophistication of relevant operations. In this talk I will first briefly mention one novel event-based modelling framework for cyber physical material handling, which, by separating operations and the corresponding materials, can significantly improve reusability of pre-developed models, making it potentially feasible to support a “drag and play” strategy, when constructing or reconfiguring a material handling system without a need of starting from scratch. After that, I will focus on a novel task routing and scheduling approach within a distributed synthesis framework based on time weighted discrete-event models. By going through an example of operation planning for linear cluster tools, I will show the potential advantage of this supervisor synthesis approach. In addition, I will show that the same modelling and synthesis framework can be applied to robot motion planning problems, accompanied by large–scale case studies in a simulated environment.

**Dr. Rong Su** obtained his Bachelor of Engineering degree from University of Science and Technology of China in 1997, and Master of Applied Science and PhD degrees from University of Toronto in 2000 and 2004, respectively. After being affiliated with University of Waterloo and Technical University of Eindhoven, he joined Nanyang Technological University in 2010. Dr Su’s research interests include discrete event system theory, model-based fault diagnosis, operation planning and scheduling and control of multi-agent systems, with applications in smart manufacturing, intelligent transportation, human-robot interface, power management and smart buildings. He has more than 110 publications and 2 patents in the aforementioned areas. So far he has been involved in several projects funded by Singapore National Research Foundation (NRF), Singapore Agency of Science, Technology and Research (A\*STAR), Singapore Ministry of Education (MoE), Singapore Civil Aviation Authority (CAAS) and Singapore Economic Development Board (EDB). Dr Su is a senior member of IEEE, and an associate editor for Journal of Discrete Event Dynamic Systems: Theory and Applications, Transactions of the Institute of Measurement and Control, and Journal of Control and Decision. He is also the Chair of the Technical Committee on Smart Cities in the IEEE Control Systems Society.