Incremental sheet forming (ISF) is a promising sheet metal forming technology to manufacture complex 3-D shell products. However, a common technical problem in ISF is the non-uniform thickness distribution of formed parts; particularly excessive thinning in steep regions, which may lead to fracture and limit the process formability.

In this seminar, Zhaobing will present his studies on the multi-pass deformation design in ISF, which can significantly improve the process formability as well as thickness distribution in the final parts compared to single-pass forming. Additionally, the effects of process parameters will be investigated in terms of process formability, forming forces, surface finish and geometric accuracy.

Particular focus will be given to the analytical modelling for the multi-pass deformation design as well as finite element analysis and experimental validation. The material flow mechanism during multi-pass forming will be discussed to explain the improved formability given the proposed multi-pass deformation design.

A discussion about the thickness distribution of final parts between single-pass forming and multi-pass forming will be included as well.

Zhaobing Liu started his PhD research at the University of Queensland in November 2010 under the supervision of A/Prof Paul Meehan and Dr Bill Daniel.