

SEMINAR SERIES  
Department of Quantitative Analysis and Operations Management  
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**The Iterative Use of Dissimilar Models**

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In this presentation we discuss iterative techniques in which models of different types are executed serially and in tandem to advantage. Two methods are discussed. The first method deals with dissimilar models of the same system. We are specifically interested in a large-scale simulation model and a large-scale LP of a strategic airlift situation. When it is possible to effect a meaningful cross-flow of information between the two model types, we are able to show, under certain conditions, that a convergence in both the inputs and outputs will occur. The closeness of the outputs of the two models is then used to develop a notion called "co-validation". The second method deals specifically with the parallel use of a simulation model and an analytic model (such as a closed queuing model). Here it is assumed that the simulation model is much more expensive to run than the analytic model. We use the analytic model in a variety of ways to help us efficiently employ the simulation model. We merge a natural application of the analytic model as an external control (for variance reduction) with another, perhaps more interesting application, where the analytic model is used as a surrogate model in a RSM type of search procedure. We can rapidly probe some interesting region of applicability using the analytic model, saving runs of the simulation model to validate indications during and at the end of the search.

Kenneth W. Bauer, Jr. is a Professor in the Department of Operational Sciences at the Air Force Institute of Technology. He holds a Ph.D. in Industrial Engineering from Purdue, an M.S. in Operations Research from AFIT, a Master's of Engineering Administration from the University of Utah, and an M.S. in Mathematics from Miami University. His research interests include the statistical aspects of neural networks and simulation modeling.