SUBJECT:	Ph.D. Proposal Presentation
BY:	Manas Bajaj
TIME:	Friday, July 7, 2006, 9:00 a.m.
LOCATION:	MARC Building, Room 201
TITLE:	A Composable Knowledge Methodology for Efficient Analysis Problem Formulation in Simulation-based Design
COMMITTEE:	Dr. Chris Paredis, Co-Chair (ME) Dr. Russell Peak, Co-Chair (MARC) Dr. David Rosen (ME) Dr. David McDowell (ME) Dr. Charles Eastman (COA and COC) Dr. Steve Fenves (NIST & CMU)

SUMMARY

In simulation-based design, a key challenge is to formulate and solve analysis problems efficiently to evaluate a large variety of design alternatives. The solution of analysis problems has tremendously benefited from advancements in commercial off-the-shelf mathematical solvers and computational capabilities. However, the formulation of analysis problems (realized as models) for a given set of design alternatives is a laborious and costly process. In the scope of design alternatives with variable topology multi-body (VTMB) characteristics, this research shall answer the following primary question: How can we improve the efficiency of the analysis model formulation process for VTMB problems? To achieve this, a Composable knowledge methodology is proposed in this research. The fundamental premise of this methodology is to formalize: (a) the idealization knowledge, used in creating analysis models, as modular, reusable, analyst-intelligible, building blocks; (b) the analysis model as a composed system of these building blocks; and (c) a model transformation process using which an analyst may automatically create the analysis model (composed system) from the design model. The envisioned impact of this methodology is to provide a systems-oriented, time- and cost-effective, foundational approach for analysis problem formulation.