1064-76-381 **Philippe Sucosky***, 143 Multidisciplinary Research Building, Department of Aerospace and Mechanical Engine, University of Notre Dame, Notre Dame, IN 46556. *Modeling of Heart Valve Disease: State-of-the-Art and Future Directions.*

As the underlying cause of 44,000 deaths in the US, calcific aortic stenosis has significant societal impact. This condition characterized by an accumulation of calcium on aortic valve leaflets leads to the obstruction of the left ventricular outflow and ultimately heart failure. Although tremendous progress has been achieved in the design of valve implants, valve replacements still pose significant challenges related to surgical risks and implant durability. The development of novel methods enabling the early detection of the disease and its non-invasive management has been hampered by the lack of understanding of valvular pathobiology. Although the onset of valvular disease was attributed for years to risk factors and genetic predisposition, recent developments suggest that abnormal mechanical stresses may also cause tissue calcification. The complexity of valvular hemodynamics along with the paucity of information on valvular biology provide an intriguing system to investigate the mechanobiological root of valvular disease and to utilize this knowledge toward the design of patient-specific models of disease progression. This presentation describes the state-of-the-art in valvular flow techniques, ex vivo mechanobiological studies and valvular disease progression modeling. (Received September 14, 2010)