



# UNIVERSITY OF NOTRE DAME

AEROSPACE AND MECHANICAL ENGINEERING

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## SEMINAR ANNOUNCEMENT

**SPEAKER:** Dr. K. Jane Grande-Allen  
Department of Bioengineering  
Rice University  
Houston, Texas

**TOPIC:** Organ Culture and Tissue Engineering Models of Heart Valve Disease

**DATE:** Tuesday, February 9, 2010

**TIME:** 3:30 p.m.

**PLACE:** 138 DeBartolo Hall

### ABSTRACT

Heart valves are some of the most complicated and mechanically active connective tissue structures in the human body. Although many aspects of their anatomy and microstructure are well characterized, other features still coming to light could have a significant impact upon the development of novel therapies for the treatment of heart valve diseases. Given that very little is known about the early stages of many heart valve diseases, my laboratory has developed several in vitro approaches to investigate potential disease mechanisms. Organ culture systems, for example, can be used to apply mechanical stimulation to intact, living heart valves over a period of days to weeks. During this time, the chemical or mechanical environment of the valve can be manipulated to simulate disease conditions. An alternative approach that we have used is to develop engineered tissue surrogates, seeded with heart valve cells, that can be subjected to a variety of mechanical loading regimes. In all of these cases, the cultured native or engineered tissue can be examined afterwards to determine the effect of the experimental treatment upon cell behavior, extracellular matrix remodeling, or material properties. Our particular focus has been on evaluating the effects of mechanical stimulation on the valve cells' production of matrix proteoglycans and glycosaminoglycans, and conversely attempting to study the effect of these matrix components on the development of strength in engineering tissues.