

# MCS COLLOQUIUM

**Dr. Scott Hansen**  
**Iowa State University**

will present

## **Mathematical modeling of the cochlea and a related problem in control theory**

3:30 pm  
Tuesday, February 24th  
Violette Hall 1236

The cochlea is the sensory organ of the inner that allows us to hear. Vibrations from the eardrum are transmitted through an elastic membrane called the oval widow into the cochlea, which is a fluid-filled chamber that surrounds an elastic membrane called the basilar membrane. The pressure differential across the basilar membrane results in a resonance at a portion of the basilar membrane that triggers a particular auditory nerve.

There is a long history of mathematical models of the cochlea that parallels discoveries in the physiology of the cochlea. I'll describe a few of the models and some of the open problems. My own minor contriution to this subject concerns a related control theory problem: If the dynamics are prescribed over a small portion of the basilar membrane (or oval window) does this determine the dynamics of the entire cochela? This problem is important in the possible design of cochlear implants and hearing aids.

After his talk, Dr. Hansen will discuss graduate school in mathematics.

**Cookies and Refreshments!!!**