**Karen Gipson**

My specialty is physical acoustics, and I have supervised 10 GVSU student projects in three domains:

(1) Acoustic cavitation (bubble dynamics), (2) Fluid dynamics, and (3) Musical acoustics. Some of the more successful of these projects are described below. However, I am interested in other projects as well – come chat with me!

**1. Acoustic cavitation (bubble dynamics)**

a. Sonoluminescence: Single bubble sonoluminescence (SBSL) is the process of using an acoustic field to convert acoustic energy into light. The original focus was on construction of a successful SBSL cell; the only extension to date varied a few of the parameters. Many other extensions are possible using different geometries and substances.

b. Cavitation activity: We used a light scattering technique to measure the formation of bubbles as a function of various parameters such as temperature of the substrate, composition of the substrate, and distance away from an interface.

c. Microstreaming caused by cavitation: We used a microscope camera (interfaced to a computer) to document the details of fluid movement around cavitation bubbles confined near an interface.

**2. Fluid dynamics**

a. Turbulence: We constructed a Taylor-Collette (system of rotating concentric cylinders) to study the onset of turbulence in the fluid confined to the region between the cylinders. Many extensions to this work are possible.

b. Surface waves: We used a light scattering technique to measure oscillations of drops in order to measure fluid properties such as viscosity and surface tension.

**3. Musical acoustics**

a. Chimes: We used small transducers to map the radiation field of defective orchestra chimes in an attempt to discover the reason for undesired beats, which we successfully attributed to uneven speeds in the extrusion process during the manufacture of the chimes.

b. Guitar: We drove a guitar body in various vibrational modes using an electromagnet system and used particle tracers to map the vibration patterns. Subsequent attempts to set up a holography system to map the patterns in greater detail were only partially successful. Extensions of this project would require access to a dark room.