Statement of need
Our customer desires a machine that can test soft tissue samples. This machine must be compatible with the Bose Testbench system. The testing should continuously stretch and compress the sample. The customer would like to be able to test 12 samples simultaneously. It should include a solution bath, strain gage based load cells, and an easy tissue mounting fixture. It should be controlled by Labview with automatic data monitoring and collection. It should display the data as it is being collected on a display connected via Bluetooth.

Introduction and Overview
The proposed device will consist of 12 separate fatigue testing fixtures. Each fixture will consist of 2 clamps to hold the tissue sample, two adjustable arms and a custom made load cell. Each load cell will be able to be monitored independently. The upper arm and clamp will be fixed while the lower arm will be controlled by the Bose Testbench system. The Labview program should be able to completely control the device and provide real time data for each sample. The tissue clamps should allow easy placement of the tissue to avoid any damage during the preparation of the experiment. Each of the 12 samples will be kept in a solution bath during testing to prevent deterioration of the samples.

The machine will test 12 samples at once to provide as much data as possible. This should help to compensate for the variations within samples and provide the most accurate data. The data will be provided in real time. This will help catch any problems that may occur during testing. Because the samples may be running for millions of cycles it is important to catch problems as soon as possible. This machine should be able to collect and display the data wirelessly. This will make it easier to use and maintain. One unusual feature of this machine will be its ability to perform pure stretching, pure bending, or both. The device should be capable of accepting large tissue sizes to provide accurate data as well as bi-axial testing.

Realistic Constraints
One constraint on this project could be building custom load cells. Building each cell is time consuming and may be expensive. Other data collection methods should be explored to find a more cost effective solution. Other constraints could be objection to the use of animal tissues in the experiments that this machine will run. Also a solution bath could contain some chemicals that may contribute to pollution or could be hazardous to the operator. This machine must not be too noisy as it is located in a classroom. The fixtures will be subjected to millions of cycles so
the material must be able to withstand the fatigue of being operated continuously for many days. Finally it would be preferable if the machine consumed low levels of power.

Other Data
Our client is a professor at the University of Connecticut. The device will be located in a classroom so weather and moisture will not be a concern. It will be used by many different students.

Questions
1. How will bi-axial testing work?
2. Which parts of the system will be submerged in the bath. Will they need special waterproofing? Will the solution bath need to be maintained at a certain temperature? Will each sample type require a different bath?
3. How will the 12 testing fixtures be orientated with respect to each other and the Bose Testbench system?
4. How will we program Labview to control the device, and collect the data, and display it as desired?