

Project: *Determination of Hydraulic Resistance of Endovascular Stents*

Abstract:

Stents are medical tools used to aid in the treatment of aneurysms and a variety of other medical conditions, such as clogged arteries. However, insertion of stents into blood vessels can disrupt the normal blood flow, causing blockages in the vessels and unsuccessful treatment of the disease. Such complications are due to unaccounted resistances which are related to hemodynamic factors such as differences in pressure and blood velocity. Therefore it is necessary to design a testing device that measures the resistance of stents under such biologic conditions. In this project we intend to design a system with pressure control. The testing device will contain two pressure chambers, one of which will be set at a constant value and a second which will have variable pressure values. It will also simulate an endovascular environment with a stent in place in a vascular phantom to provide reliable data. A sensor will be used to send signals to a valve in order to control the flow at a secondary pressure chamber which will allow us to adjust the pressure variations according to a set value. The sensors will also provide digital feedback to a computer of the pressure and flow rate readings. This measurement device will be used to calculate the vascular resistance caused by a stent and improve the efficiency of stent designs for successful medical treatments.