1065-92-92 **Mette S Olufsen*** (msolufse@ncsu.edu), Campus Box 8205, Raleigh, NC 27695, and **Brooke N Steele**, **Daniela Valdez-Jasso** and **Mansoor A Haider**. *Predicting arterial flow and pressure dynamics using a 1D fluid dynamics model coupled with a generalized viscoelastic wall model.*

It has long been know that the systemic arteries are viscoelastic, yet few fluid dynamics models account for this phenomenon. In this study, we discuss how to couple a viscoelastic wall model with a 1D fluid dynamics model allowing accurate prediction of arterial blood flow, pressure, and vessel area. The fluid dynamics model is derived from the 1D Navier Stokes equations for an incompressible non-Newtonian flow through a cylindrical tube. This model is combined with a viscoelastic constitutive equation derived using the QLV theory to relate pressure and vessel area. The viscoelastic model is derived in general incorporating both a linear (yielding a Kelvin model) and a nonlinear sigmoidal elastic response. For the fluid domain the model assumes that a given flow is applied at the inlet, across vessel junctions the model assumes that flow is conserved and pressure is continuous, and at the vessel outlet we apply a three-element Windkessel boundary condition. This boundary condition allows us to account for the overall behavior of the remainder of the system. The coupled fluid structure interaction model is solved using a finite element method, adapted to account for time-history of the viscoelastic model. (Received September 03, 2010)