1048-92-236 **Mette S Olufsen*** (msolufse@ncsu.edu), Campus Box 8205, Raleigh, NC 27695. *Modeling blood flow and pressure-area dynamics in arteries.*

The mechanics of the arterial wall is complex, due to its material structure and load conditions, which influences hemodynamic properties as well as the growth and remodeling of the arterial network. In this study we discuss the use of arterial wall properties in fluid dynamics modeling and show how elastic and viscoelastic wall properties can be assessed using mathematical modeling. A 1D fluid dynamics model predicting flow, vessel area and pressure will be used as an example to show the importance of arterial wall modeling. To analyze wall properties we use a Kelvin and a generalized viscoelastic model, which relates blood pressure to vessel area. The fluid dynamics model was validated against in-vivo measurements of blood flow, while the vessel wall model was validated using in-vitro measurements of vessel diameter and arterial blood pressure. For the arterial wall models, material properties, represented by the model parameters, were predicted by solving an inverse problem minimizing the residual between the data and the model. Results showed that the smaller arteries, the inclusion of viscoelastic behavior is important to capture pressure-area dynamics, while for the larger arteries nonlinear elastic responses should be modeled to accurately predict pressure area dynamics. (Received February 09, 2009)