1056-76-1703 **Lisa M Melanson*** (`l-melanson@northwestern.edu`), ESAM Department, Northwestern University, 2145 Sheridan Road, Evanston, IL 60208. *Numerical Modeling of Intracranial Aneurysms.* Preliminary report.

Intracranial aneurysms are highly prevalent in the general population and pose life-threatening health risks if left untreated. The rupture of these bulbous dilatations accounts for nearly 18,000 deaths per year in North America alone. Geometry of the blood vessels and wall shear stresses can lead to changes in the material properties of the arterial wall, allowing the aneursym to grow and potentially rupture. In this study, we examine a rigid arterial wall model to investigate how this remodeling is influenced by geometry and fluid stress. The two-dimensional governing equations are solved numerically using a finite difference projection algorithm developed at the LBNL Center for Computational Sciences and Engineering coupled with an immersed boundary method. This method allows us to easily handle the complex irregular domains commonly found in blood vessels. Both idealized arterial geometries as well as geometries extracted from clinical imaging data are considered. For the same physical geometry, we compare the shear stress derived numerically with the thickness of the arterial wall in patient data allowing us to assess whether decreased shear stress weakens the vessel wall. (Received September 22, 2009)