1056-49-1690 **Michael C. Barg*** (mbarg@niagara.edu), Mathematics Department, 339 Dunleavy Hall, Niagara University, Niagara University, NY 14109, and **Jieun Lee** and **Frank Baginski**. *Analysis of Tendon-Reinforced Piecewise-Isotropic Pressurized Membranes.*

A mathematical model for a tendon-reinforced piecewise-isotropic thin inflated wrinkled membrane subjected to a position dependent hydrostatic pressure load is presented. Such a model can be used to represent a large scientific balloon, like one of those currently flown by NASA, or some other inflatable structure. The total energy of the system is assumed to consist of a position dependent hydrostatic pressure, relaxed film strain, and film and tendon weight. Energy minimizing shapes can be found as relative minimizers to a constrained optimization problem via direct methods in the calculus of variations. (Received September 22, 2009)