1135-I5-2096   **Nakeya D Williams*** (`nakeya.williams@usma.edu`), West Point, NY 10996. *Mathematical Modeling of Cardiovascular Dynamics during Orthostatic Stress.* Preliminary report.

This study develops a non-pulsatile model, from the integration of a pulsatile model, for the prediction of blood flow and pressure during orthostatic stress. Patients suffering from orthostatic intolerance , are diagnosed via a head-up tilt (HUT) test. This test is used to diagnose potential pathologies within the autonomic control system, which is complex and difficult to study in vivo. Here we show that mathematical modeling can be used to predict changes in cardiac contractility, vascular resistance, and arterial compliance, quantities that cannot be measured, but are useful to assess the system's state. The cardiovascular system is pulsatile, but predicting the control in response to HUT (over 10-40 min) is computationally challenging, and limits the applicability of the model. To overcome this complexity, we develop a simple non-pulsatile model that can be interchanged with the pulsatile model, yet both models are able to predict internal variables. Having models with various levels of complexity formulated with a common set of parameters, allows us to combine long-term average simulations with pulsatile simulations on a shorter time-scale. (Received September 25, 2017)