1145-92-770 **E Benjamin Randall*** (ebrandal@ncsu.edu.), 3745 Yorktown Pl, Raleigh, NC 27609, and **Jesper Mehlsen** and **Mette Olufsen**. *A model-based analysis of autonomic nervous function in response to the Valsalva maneuver.*

The autonomic nervous system (ANS) involuntarily maintains homeostasis and responds to stimuli with 2 systems: parasympathetic (PNS) and sympathetic (SNS). Respiratory sinus arrhythmia (synchrony of heart rate (HR) and breathing) and the baroreflex (activation of baroreceptors due to sudden increases/decreases in blood pressure (BP)) are mechanisms that regulate HR, while the baroreflex also affects the vasculature. Autonomic dysfunction (AD) occurs when the ANS behaves abnormally. The Valsalva maneuver (VM) is forced expiration against a closed airway while maintaining an open glottis. This procedure activates both the PNS and SNS as intrathoracic pressure increases. The VM has 4 distinct phases and can help diagnose AD. Mathematical modeling of the cardiovascular system with ANS control can reveal neurological function, which is not easily measured in practice. We have noninvasively obtained data that we can analyze with the model. This talk focuses on the implementation of a patient-specific coupled model that predicts ANS responses due to the VM. Moreover, we establish an inverse problem, in which we use techniques to determine a subset of identifiable parameters estimated for patient-specificity. We use this analysis to visualize AD in abnormal patients versus healthy ones. (Received September 14, 2018)