1145-AB-630 **James D Pleuss*** (james.pleuss@usma.edu), **Kevin Talty**, **Morse Steven**, **Patrick Kuiper**, **Michael Scioletti**, **Steven B. Heymsfield** and **Diana Thomas**. *A machine learning approach relating 3D body scans to body composition in humans.*

A long-standing question in nutrition and obesity research involves quantifying the relationship between body fat and anthropometry. To date, the mathematical formulation of these relationships has relied on pairing easily obtained anthropometric measurements such as the body mass index (BMI). Herein, we leverage 3D scanned anthropometry obtained from a population of US Army basic training recruits to derive four sub-populations of homogenous body shape archetypes using a combined principle components and cluster analysis. While the Army database was large and diverse, it did not have body composition measurements. Therefore, these body shape archetypes were paired to an alternate smaller sample of participants from the Pennington Biomedical Research Center that were not only similarly imaged by the same 3D scanning machine, but also had concomitant measures of body composition by dual energy X-ray absorptiometry body composition . With this enhanced ability to obtain anthropometry through 3D scanning quickly of large populations, our machine learning approach for pairing body shapes from large datasets to smaller datasets that also contain state of the art body composition measurements can be extended to pair other health outcomes to 3D body shape anthropometry. (Received September 11, 2018)