Kerry Danelson

As part of a multi-center group headed by Dr. Warren Hardy at Virginia Tech, Dr. Danelson is involved in a research project that is developing a crash test dummy for military vehicles. Underbody body blast continues to be a threat to soldiers, sailors, marines, and airmen deployed in combat operations. To improve the prediction of occupant injury in military vehicle blast testing, the Army is leading an effort to create the dummies. A critical step in this development project is to conduct testing that elucidates how injuries happen in this loading environment. In collaboration with Virginia Tech (Dr. Hardy, Dr. Kemper, Dr. Untaroiu, and Dr. VandeVord) and the Ohio State University (Dr. Bolte), Dr. Danelson will conduct cadaveric testing on the Army’s Accelerative Loading Fixture (ALF) testing apparatus and in the lab. Extensive occupant instrumentation will be analyzed as well as full imaging and autopsies to quantify occupant injury (Figure 2). These findings will be used to assess the dummy biofidelity and injury risk criteria. Orthopaedic physician collaborators, Dr. Scott, Dr. Emory, and Dr. O’Gara, will assist with injury mechanism identification.

Dr. Danelson is also working on a second related project with the Army Research Laboratory at Aberdeen Proving Grounds to analyze real world injuries from Wounded in Action and Killed in action service members. This research project will assess the occupant’s injuries as well as vehicle and event information to better understand the full injury event. Again, these data will be used to develop a military crash test dummy that predicts injuries that are relevant to the warfighter. Orthopaedic collaborators are also involved with this project for mechanism development, Dr. Tuohy and Dr. Birkedal.

Figure 2: Calcaneus (left) and pelvis (right) fractures from previous cadaveric testing on the accelerative loading fixture.

Additionally, Dr. Danelson is interested in supporting existing orthopaedic biomechanical testing as well as expanding the existing research program. She has experience with finite element modeling which she will use to support investigations into shoulder and spine biomechanics.