Injury mitigation in transportation and defense applications: Moving forward in challenging times.

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Abstract The traditional approach to achieving scientific progress is under pressure. Historically, society has relied upon collaboration between academia, government, and industry to improve safety and mitigate injury and death. In pursuit of this goal, researchers in empirical biomechanics and computational modeling have labored for decades to develop and advance passive and active safety technologies for in the mobility and defense sectors. This includes studying injury mechanism and tolerance in the furtherance of effective physical and virtual predictive tools. These efforts are vital to the wellbeing of travelers and warfighters. However, emerging challenges to the research community present significant impediment to continued improvement in warfighter and transportation safety.

Since being established in 1970, the National Highway Traffic Safety Administration (NHTSA) has been central to the field of transportation safety in the United States. NHTSA has funded countless research programs that have supported many PhD students who became valuable members of the safety community, joining either universities, vehicle manufacturers or suppliers, or government agencies around the world as their career choice. The Federal Motor Vehicle Safety Standards (FMVSS) and New Car Assessment Program (NCAP) have been influential worldwide. Similarly, the US Department of Defense has provided considerable funding for warfighter safety, influencing practices around the world. Going forward, it is critical that the global safety community prioritize support of student research activities, and look beyond the conventional in this pursuit. While new technologies are providing new solutions to overall safety, there are still sizable knowledge gaps, including in basic biomechanical impact and injury response that must be filled. Cooperation between academia and industry is more important than ever before. And, as always, the international and advocacy communities have essential roles to play.

Contractions in resources and workforce are undermining the education and training of graduate students, who are essential to future safety innovation. This comes at a time when safety is receiving increased interest and attention related to strategies such as Vision Zero and the Safe System Approach, and populations at greater risk such as vulnerable road users. This comes at a time when there is hope to make real progress in reduction of musculoskeletal cumulative microtrauma, behind-armor blunt impact injury, primary blast related injury, and in the improvement in personal protective equipment design for the warfighter. This is also a time when sophisticated technologies such as integration of passive and active safety, adaptive and optimized restraints, occupant sensing, advanced driver assistance systems, and automated vehicles are beginning to realize important benefits for the driving public. In other words, this is the time to allocate more to safety research. It is not the time to retreat.

This presentation will highlight some of the speaker's research achievements in transportation and warfighter safety. Historical achievements of the safety community, knowledge gaps, and topics associated with emerging technologies will be discussed. The importance and influence of NHTSA and defense-related activities will be reviewed. The crucial need for graduate students to carry the safety torch into the future for us all will be reinforced.

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