Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Impact force of human high diving. ANUPAM PANDEY, JISOO YUK, Cornell University, BRIAN CHANG, Temple University, FRANK FISH, West Chester University, SUNGHWAN JUNG, Cornell University — Diving from high platforms, and cliffs into water is a popular adventure sport and is expected to become a part of summer Olympics in the near future. High diving, as it is commonly known, involves participants jumping from heights beyond 20m. Naturally, the body orientation is crucial for surviving the large impact forces during such a dive. The rule of thumb among divers is that for heights above 14m, the safest orientation to dive is feet first. In this talk, we will discuss the impact forces that a human body experiences in diving head first, hands first, or feet first. Since most of the diving related injuries happen during the impact phase, we will focus on the early time dynamics of the water entry, where the unsteady liquid forces are dominant and dependent on the shape of the body. We will show that the impulse due to impact, which incorporates the relevant timescale of unsteady forces, varies across the different diving forms and is responsible for muscle/bone injuries. As such, this study presents a fluid mechanics based protocol for safe high diving.

Anupam Pandey
Cornell University

Date submitted: 07 Aug 2020 Electronic form version 1.4