ME Seminar

Mild Traumatic Brain Injury: Its Sensing, Prevention, and Understanding

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ABSTRACT

The human brain continues to amaze us with its complexity and intricacy. As we marvel at the exciting advancements in brain research, an aspect that is less often emphasized is the brain's mechanical fragility. The brain's mechanical deformation, such as that caused by head movements and impacts during sports, can be sufficient to injure it. This type of injury is termed mild traumatic brain injury (mTBI). One of the particularly insidious aspects of this injury is that it is quite challenging to detect in its early stages. I will discuss ongoing research in my lab that combines inertial sensors, computations, and mechanics to flag events with significant potential for triggering mTBI. I will also discuss our collaboration with Prof. Diane Hoffman-Kim's group at Brown, aimed at better understanding mTBI through mechanobiology experiments.

ABOUT THE SPEAKER

Haneesh Kesari is currently an Associate Professor of Engineering at Brown University. At Brown, he is affiliated with the Solid Mechanics group. Previously he received his Ph.D. and M.S. degrees from Stanford University in 2011 and 2007, respectively. Prior to that, he received his undergraduate degree in Mechanical Engineering from the Indian Institute of Technology Guwahati in 2005.

Dr. Kesari is broadly interested in applied mechanics problems. He has worked on problems from the fields of Contact Mechanics, Fracture Mechanics, Mechanics of Composites, Rigid Body Mechanics, and Instabilities/Buckling. These problems are investigated using a synergistic combination of analytical, computational, and experimental tools. The analytical tools involve techniques from asymptotic analysis, homogenization, and calculus of variations. Computational tools include numerical techniques based on regularized variational fracture theories and contact theories. Experimental techniques include small-scale mechanical testing, scanning electron and atomic force microscopies, and custom inertial sensing systems. For a further overview of his research interests, please visit: https://appliedmechanicslab.github.io/

January 24, 2025, 4:00 PM, AR Auditorium, Mechanical Engineering, IISc