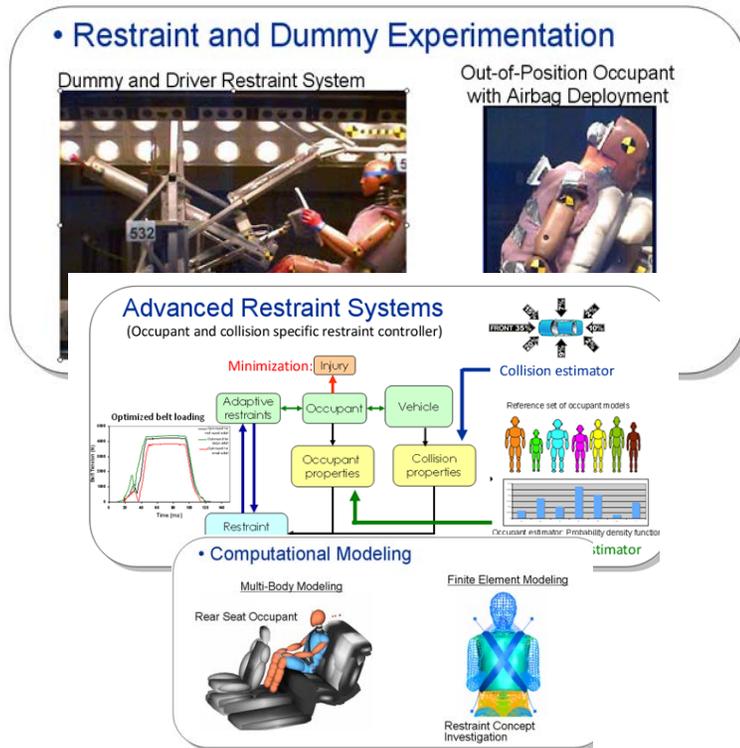


Center for Applied Biomechanics



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“Improving the quality of life through the mitigation and prevention of injury made possible by better understanding the mechanical response of the human body, and to provide the highest quality education and training to our students.”

The University of Virginia Center for Applied Biomechanics (CAB), which just celebrated its 20th anniversary, is the largest university-based injury biomechanics laboratory in the world. The 30,000 square-foot state of the art facility includes servo-hydraulic and electro-mechanical materials testing machines, a Seattle Safety Systems servo-controlled reverse-acceleration sled, a VIA Systems deceleration sled, a 16-camera high-speed motion capture system, and the world’s first university-based full-scale rollover sled system, which is capable of rolling an SUV at 400-deg/s and dropping it onto a moving roadbed. The Center is a joint venture of the Schools of Engineering and Medicine and houses researchers with backgrounds in mechanical, biomedical, electrical, and civil engineers, a biostatistician, an epidemiologist, orthopedic surgeons, ER doctors, radiologist, and a pathologist. The extensive capabilities of the Center allow for diverse research, as seen below.



Auto Safety Research

Research at the CAB studies injury trends and identifying increased-risk populations in the field; investigating mechanisms and threshold of injury; determining the mechanical characteristics of the body and its constituent tissues; development and evaluation of dummies and computational models; occupant protection through restraint design, evaluation, and optimization.

Constitutive Modeling

The CAB is focusing on constitutive modeling of biological material in order: to acquire a better knowledge of the response of biological materials under high strain rate loadings (specific to car crash rates); to obtain material properties that can be integrated in finite element human body models.

Computational Modeling

Computational modeling includes crash reconstruction of pedestrian accidents using Madymo models and Optimization Techniques.

Crash Investigations

The Crash Injury Research and Engineering Network (CIREN) is a multi-center research program involving a collaboration of clinicians and engineers in academia, industry, and government coordinated by the National Highway Traffic Safety Administration (NHTSA). The CAB is a collaborator with CIREN.

Military Studies

The main goal of the CAB is to increase soldier survivability and performance. Our research runs the gamut from blunt trauma to ballistics and blast. Our unique skills allow us to examine and prevent injuries from the cellular level, through to the body armor and helmet level, all the way to the occupant level.

Pedestrian Studies

Pedestrian injuries as a result of automobile incidents are studied from many different angles. Epidemiological and forensic data are used to design biomechanical experiments which inform computational models designed to characterize the forces incurred.

Pediatric Studies

Our research ranges from studies of tissue development and mechanical behavior to applied assessments of child restraint and booster seat design and performance for pediatric test dummies. We are also leading the way toward improved protection for child pedestrians through our research on the biomechanics of the interactions between vehicle structures and the developing human body.

RECENT RESEARCH DEVELOPMENTS

- Formulated an international standard for pedestrian dummy requirements
- Improved restraints for an aging occupant population
- Developed specifications for military helmet design

RECENT GRANTS

- DOT – CIREN Center NHTSA
- Hyundai Motor Company – Controlled Laboratory Rollover Crash Tests
- DOT – Biomechanics of Injury
- TEMA – Evaluation of Vehicle Kinematic and Occupant Response/Injury During Rollover Crashes
- Honda R&D – Rollover Injury Prevention

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