

Robert T. Bove Jr., Ph.D.
Manager

Professional Profile

Dr. Robert T. Bove Jr. is a Manager in Exponent's Biomechanics practice. Dr. Bove's area of expertise is injury biomechanics, with an emphasis on kinematics and human tolerance to mechanical forces. He performs accident reconstruction and biomechanical analyses to determine accident configuration and severity, as well as injury mechanisms, with particular emphasis on computer modeling. His work includes analysis of injuries occurring motor vehicle accidents, occupational and industrial accidents, and injuries involving the use of consumer products. Dr. Bove also has experience analyzing falls from a height and accidents involving injuries sustained in swimming pools.

Dr. Bove's research experience includes analysis of occupant kinematics during motor vehicle rollover accidents, determination of cervical spine loading in low-speed rear impacts, and examination of how occupants of different body sizes (including obese occupants) fit within the occupant compartment of a motor vehicle.

Dr. Bove has held an academic appointment as a Visiting Lecturer in the Department of Mechanical and Aerospace Engineering at Princeton University and as an Adjunct Professor in the Department of Mechanical Engineering at Temple University. Dr. Bove received his doctorate in Bioengineering from the University of Pennsylvania in 2003, where he worked with the Electrophysiology Research Group at the University of Pennsylvania Presbyterian Medical Center conducting animal studies using a laser imaging system to analyze the movement of electrical wave fronts in the heart during ventricular fibrillation. Prior to joining Exponent, Dr. Bove was an engineer at Galaxy Scientific Corporation, where he worked evaluating image compression software for military and medical applications. Dr. Bove's prior work experience also includes employment by the Central Intelligence Agency. He also has expertise in cardiac electrophysiology, computer modeling and image processing, and has experience in animal surgery.

Academic Credentials and Professional Honors

Ph.D., Bioengineering, University of Pennsylvania, 2003
M.S.E., Bioengineering, University of Pennsylvania, 1996
B.B.E. (Bachelor of Biomedical Engineering), Catholic University of America (*magna cum laude*),
1994

Ashton Fellowship, University of Pennsylvania, 1994–1998; University Fellowship, University of Pennsylvania, 1994; Biomedical Engineering Society Award, Catholic University of America, 1994; Tau Beta Pi (Engineering Honor Society); Arch Diocesan Scholarship, Catholic University of America, 1989–1993

Publications

Bussone W, Bove R, Thomas R, Richards D, Prange M. Six-degree-of-freedom accelerations: Linear arrays compared with angular rate Sensors. Society of Automotive Engineers, SAE 2010-01-1017.

Bussone W, Moore T, Richards D, Bove R, Scher I, Prange MT. Measurements of non-injurious head accelerations of a pediatric population. Society of Automotive Engineers, SAE 2009-01-0383.

Gloeckner DC, Bove RT, Croteau J, Corrigan CF, Moore, TLA. Timing of head-to-vehicle perimeter contacts in rollovers. Paper 2007-01-0370 presented at the 2007 SAE World Congress, April 2007.

Yamaguchi GT, Ashby BM, Luepke PA, Moore TLA, Bove RT, Corrigan CF. Theoretical analysis of a method of computing dynamic roof crush during rollovers. Paper 2007-01-0366 presented at the 2007 SAE World Congress, April 2007.

Bove RT, Fisher JL, Ciccarelli L, Cargill RS, Moore TLA. The effects of anthropometry on driver position and clearance measures. Paper 2006-01-0454 presented at the 2006 SAE World Congress, April 3–6, 2006.

Vijayakumar V, Scher I, Gloeckner DC, Pierce J, Bove R, Young, Cargill R. Head kinematics and upper neck loading during simulated low-speed rear-end collisions: A comparison with vigorous activities of daily living. Paper 2006-01-0247 presented at the 2006 SAE World Congress, April 3–6, 2006.

Bove RT, Dillon SM. Optically imaging cardiac activation with a laser system. IEEE Engineering in Medicine and Biology 1998; 17:84–94.

Pruente HM, Bove RT, Kwaku K, Dillon SM. Animated images of cardiac membrane voltage during defibrillation. J Electrocard 1995; 28:7–14.

Presentations and Published Abstracts

Fisher J, Bove R, Moore T. Lumbar spine loads in low- and moderate-speed rear-end collisions. Proceedings, ASME 2008 Summer Bioengineering Conference, Marco Island, FL, 2008.

Moore T, Bove R. Using injury tolerance data to reconstruct accidents. Proceedings, ASME 2008 Summer Bioengineering Conference, Marco Island, FL, 2008.

Steffey DL, Bove RT, Fisher JL, Ciccarelli L, Cargill RS, Moore TLA. Characterization of occupant anthropometry and clearance measures in passenger cars. Joint Statistical Meetings, Seattle, WA, August 6–10, 2006.

Bove RT, Dillon SM. A new high performance system for imaging cardiac electrical activity. *Circulation* 1996; 94: I-714 (abstract).

Prunte HM, Bove RT, Kwaku K, Dillon SM. Animated images of cardiac membrane voltage during defibrillation. In: Okin PM and Kornreich F (Chairs), Abstracts, International Society for Computerized Electrocardiology, 20th Annual Conference, 1995.

Project Experience

Extensive experience analyzing occupant kinematics and potential injury mechanisms in high-energy motor vehicle accidents, including high-speed frontal impacts, high-speed rear-end impacts, and rollovers. Investigations involved evaluations of various issues including roof deformation, seat back yielding, and seat belt restraint configuration and usage.

Investigated the circumstances surrounding falls from a height for premises liability litigation. Performed analyses, including the use of computational models of human body kinematics, to determine if the falls were the result of an accidental trip or intentional jump.

Investigated the circumstances surrounding spinal injuries resulting from dives into shallow bodies of water (including swimming pools). Analysis included computational modeling of both the air trajectories of the person and their trajectory once in the water to answer questions ranging from whether a deeper pool would have prevented their injuries to what were the circumstances surrounding their entry into the water, for instance, distinguishing between a voluntary dive and an accidental slip.

Performed numerous product, vehicle, and accident site inspections.

Participated in a variety of experimental testing using anthropomorphic test devices (crash test dummies) and human subjects to investigate occupant kinematics and injury potential in motor vehicle accidents, including dynamic sled testing and static rollover testing.

Extensive experience analyzing low energy motor vehicle incidents, including low speed rear-end impacts, low-speed frontal impacts and sideswipe vehicle interactions, to evaluate injury causation. Analysis included reconstruction of the vehicle motions and determination of the corresponding forces acting on the occupants.

Analyzed a variety of elevator incidents to evaluate injury causation. Analysis included inspections of elevators and measurement of the elevators' accelerations to evaluate the elevator motion and determine the corresponding forces acting on the elevator occupants.

Current Academic Appointments

Visiting Lecturer, Department of Mechanical and Aerospace Engineering, Princeton University

Previous Academic Appointments

Adjunct Professor in the Department of Mechanical Engineering at Temple University

Professional Affiliations

- Society of Automotive Engineers (member)