

BRIAN WEAVER

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**BIOMECHANICS | RAILROAD
INVESTIGATION | TRAFFIC
ACCIDENT RECONSTRUCTION |
MECHANICAL & METALLURGICAL
ENGINEERING**

EDUCATION

MICHIGAN STATE UNIVERSITY

MSE Engineering Mechanics
BSE Engineering Mechanics /
Biomechanics

LICENSES & CERTIFICATIONS

Professional Engineer MI
#6201057631
Professional Engineer IL
#062059251
Certified Crash Data Retrieval (CDR),
Vetronix, Collision Safety Institute, Inc.
Articulated Total Body (ATB) Simulation,
Veridian, Inc.
PADI Certified Open Water Scuba Diver

AFFILIATIONS

Lawrence Technological University
Biomedical Engineering Advisory Board
American Society of Biomechanics (ASB)
SAE International
American Society of Mechanical
Engineers (ASME)

PROFESSIONAL PROFILE

Mr. Brian Weaver is a Professional Engineer and consultant specializing in biomechanics, accident reconstruction, computer simulation, and mechanical systems design. He has experience providing consultation in the investigation and prevention of injuries from product, vehicular, workplace, and other types of accidents.

His graduate training and research was conducted in the Orthopedic Biomechanics Laboratory at Michigan State University, which was a joint collaboration with the College of Engineering and the School of Osteopathic Medicine. His research and publications focused on the determination of injury mechanisms and the effects of blunt trauma to soft tissues.

With unique expertise in both biomechanics and accident reconstruction, he has performed investigations involving vehicle accidents (heavy trucks, passenger cars, recreational vehicles, motorcycles, etc.) and aviation accidents.

Additionally, Mr. Weaver is an Adjunct Professor at Lawrence Technological University in the Biomedical Engineering Department. Along with his teaching responsibilities, he is a member of the Lawrence Technological University Biomedical Engineering Advisory Board. In his capacity, he has worked with undergraduate students by sponsoring a senior research project to determine fracture patterns in human long bones when run over by moving railroad equipment.

AREAS OF EXPERTISE

Biomechanics
Injury Causation and Analysis
Work Place Safety and Injury Analysis
Railroad
Construction
Maritime
Slips, Trips, & Falls
Single, Multiple & Specialty Vehicle Accident Reconstruction
Pedestrian-Vehicle Incidents
Collision Severity and Injury Potential Analysis
Mechanical Failure Analysis
Restraint Usage and Efficacy Analysis
Product Liability
Litigation Support

EXPERIENCE

Explico

2014 - Present *Principal Engineer*

Lawrence Technological University

Biomedical Engineering Department

2013 - Present *Adjunct Professor*

Weaver Engineering Company (Renamed to Explico Engineering Co.)

2013 - 2014 *President and Principal Engineer*

Armstrong Forensic Engineers, Inc.

2011 - 2013 *Director of Biomechanics*

Exponent Failure Analysis Associates

2001 - 2011 *Managing Engineer*

PEER REVIEWED TECHNICAL PUBLICATIONS

Weaver BT, Braman J, Haut RC. *A Direct Method for Mapping the Center of Pressure Measured by an Insole Pressure Sensor System to the Shoe's Local Coordinate System.* J Biomechanical Engineering, 2016

Weaver BT, Fitzsimmons K, Braman J, Haut RC. *The Role of Shoe Design on the Prediction of Free Torque at the Shoe-Surface Interface Using Pressure Insole Technology.* J Sports Biomechanics, 2016

Weaver BT, Fitzsimmons KA, Braman JE, Haut RC. *Torque prediction at the shoe-surface interface using insole pressure technology.* J Sports Engineering and Technology, 2013

Rundell SA, Guiang A, Weaver BT, Meyer EG. *Characterization of Occupant Lower Extremity Behavior During Moderate-to-High Speed Rear Impacts.* Society of Automotive Engineers, 2013

Wei F, Braman JE, Weaver BT, Haut R. *Determination of Dynamic Ankle Ligament Strains from a Computational Model Driven by Motion Analysis Based Kinematic Data.* J Biomechanics, 2011

Weaver BT, Ruberte L, Khan F, Arndt S. *Normal pedal activation in real world situations.* Society of Automotive Engineers, 2011

Ashby B, Lai W, Carhart M, Newberry W, Weaver BT, Ford Corrigan C. *Compressive neck preloading during the airborne phase of vehicle rollover.* Society of Automotive Engineers, 2007

Weaver BT, Haut R. *Enforced exercise after blunt trauma significantly affects biomechanical and histological changes in rabbit retro-patellar cartilage.* J Biomechanics, 2005

Ewers B, Weaver BT, Haut R. *Impact orientation can significantly affect the outcome of a blunt impact to the rabbit patellofemoral joint.* J Biomechanics, 2002

Ewers B, Weaver BT, Sevensma E, Haut R. *Chronic changes in rabbit retropatellar cartilage and subchondral bone after blunt impact loading of the patellofemoral joint.* J Orthopaedic Research, 2002

Johnson A, Probst C, Decamp C, Rosenstein D, Hauptman J, Kern T, Weaver BT. *Comparison of trochlear block recession and trochlear wedge recession for canine patellar luxation using a cadaver model.* J Veterinary Surgery, 2011

ABSTRACTS

Button KD, Cai Y, Nolasco LA, Weaver BW. (2024) *A Computational Modeling Approach for the Forensic Analysis of Infant Short Height Falls.* Summer Biomechanics, Bioengineering, and Biotransport Conference, #465.

Sproule D, Rossman S, Snyder P, Button K, Weaver B, Rundell S. *Biomechanical Analysis of a Low Speed Rear-End Collision Using a Subject-Specific MADYMO Simulation*. XXVII Congress of the International Society of Biomechanics held in conjunction with the 43rd Annual Meeting of the Society of Biomechanics, 2019.

Snyder P, Figueroa R, Weaver B. *Vertical Hard, Stirrup, and Ground Reaction Force in Occupational Railcar Ascent*. Summer Biomechanics, Bioengineering, and Biotransport Conference, 2020.

Snyder P, Watts D, Sproule D, Rossman S, Button K, Weaver B, Rundell S. *Out-of-Position Analysis of Low Speed Rear-End Collision Using a Subject-Specific MADYMO Simulation*. Biomedical Engineering Society Annual Meeting, 2019.

Sproule D, Rossman S, Snyder P, Button K, Weaver B, Rundell S. *Subject-Specific MADYMO Analysis of a Low Speed Rear-End Collision*. Summer Biomechanics, Bioengineering, and Biotransport Conference, 2019.

Button K, Davison M, Weaver B, Rundell S. *Inertial Loading of the Pediatric Head Exceeds Neck Injury Tolerance Prior to Head Injury Tolerance*. American Society of Biomechanics Annual Meeting, 2018.

Rossman S, Sproule D, Button K, Weaver B, Rundell S. *Intervertebral Disc Herniation Risk During Low-Speed Lateral Collisions*. 8th World Congress of Biomechanics, 2018.

Rossman S, Sproule D, Button K, Weaver B, Rundell S. *Intervertebral Disc Herniation Risk During Low-Speed Lateral Collisions*. American Society of Biomechanics Conference, 2018.

Sproule D, Rossman S, Button K, Weaver B, Rundell S. *Simulation of Occupant Kinematics in Low-Speed Lateral Collisions using Articulated Total Body*. 8th World Congress of Biomechanics, 2018.

Sproule D, Rossman S, Button K, Weaver B, Rundell S. *Simulation of Occupant Kinematics in Low-Speed Lateral Collisions using Articulated Total Body*. American Society of Biomechanics, 2018.

Weaver BT, Davison M, Rundell SA, Meyer E. *An Investigation of Human Long Bone Fracture Patterns During Traumatic Amputations from Moving Railroad Equipment*. Proceedings of the Summer Biomechanics, Bioengineering and Biotransport Conference (Sb3C2016). Technical Paper No.1092

Weaver BT, Braman J, Haut RC. *The Determination of Free Torque on Athletic Turf Surfaces Using Insole Pressure Data*. Proceedings of the Summer Biomechanics, Bioengineering and Biotransport Conference (Sb3C2016). Technical Paper No.1079

Button KD, Rossman SM, Weaver BT, Rundell SA. *Cervical Spine Forces and Disc Herniation Risk During Standardized Rear-End Impact Testing*. Proceedings of the Summer Biomechanics, Bioengineering and Biotransport Conference (Sb3C2016). Technical Paper No.930

Davison MA, Weaver BT, Rundell SA. *Investigation of Neck and Head Injury Potential during Inertial Loading of the Pediatric Head: Implications to Shaken Baby Syndrome Characterization*. Proceedings of the American Society of Biomechanics Annual Meeting, 2015.

Weaver BT, Brian J, Haut R. *A Novel Approach to Map the Center of Pressure Measured by Insole Pressure Sensor Technology onto the Shoe Coordinate System.* Proceedings, 7th World Congress in Biomechanics, 2014. Technical paper No.14-A-3961-WBC

Weaver BT, Fitzsimons KA, Braman JE, Haut RC. *The use of plantar insole pressure sensors to predict the free torque produced at the shoe-surface interface during internal rotation of the body relative to a planted foot.* Proceedings of the ASME 2013 Summer Bioengineering Conference. SBC2013-14497.

Rundell SA, Weaver BT. *Forward Bending with Increased Erector Spine Force Helps Reduce Disk Herniation Risk.* Proceedings of the American Society of Biomechanics Annual Meeting, 2012.

Wei F, Braman JE, Weaver BT, Haut R. *Determination of In Vivo Ankle Ligament Strains During External Rotation of the Foot.* Proceedings, ASME Summer Bioengineering Conference, 2011. Technical paper No.SBC2011-53395

Giachetti R, Weaver BT, Trimble J. *Real-time monitoring and analysis of whole body vibration in locomotive engineers.* Proceedings, 4th International Conference on Whole Body Vibration Injuries, Montreal, QC, June 2009.

Arndt S, Krauss D, Weaver BT. *A previously unidentified failure mode for ladder-climbing fall protection systems.* Proceedings, American Society of Safety Engineers Professional Development Conference and Exposition, Las Vegas, NV, 2008.

McCann D, Weaver BT, Smith S, Meacham E. *Modal testing diagnosis of bus seat failures.* IMAC XXII Proceedings, Society of Experimental Mechanics, Dearborn, MI, January 2004.

Weaver BT, Ewers E, Haut R. *Regular exercise is beneficial to a stable joint after trauma.* Proceedings, 48th Annual Orthopaedic Research Society Meeting, 2002.

PROFESSIONAL DEVELOPMENT

Northwestern University Center for Public Safety

Vehicle Accident Reconstruction I

Vehicle Accident Reconstruction II

Society of Automotive Engineers

Applied Vehicle Dynamics, BMW Performance Driving School

Michigan State University

Neural Basis of Human Movement

Neural basis of sensorimotor control, investigating cortical and subcortical structure function relationships in healthy humans, and in individuals with movement disorders.

Experimental Design and Data Analysis

Practical application of statistical principles to the design of experiments and analysis of experimental data in biomedical sciences.

Injury Control in Sports and Physical Activity

Principles of epidemiology to identify and analyze risk of injury in physical activities. Skills for decision-making in injury prevention programs.