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Engineering & Scientific Consulting

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Professional Profile

Dr. Imler has expertise in injury biomechanics with a focused interest in understanding the role of extrinsic factors on human performance, injury, and recovery through measurement of biomechanical data collected during activities performed in a naturalistic environment. She has extensive project engagement in the areas of human motion and injury potential; evaluations of safety countermeasures and personal protective equipment; and analysis of real-world injury data. She has investigated these issues in the context of sporting and recreational activities, incidents involving industrial and agricultural equipment, and motor vehicle collisions. Dr. Imler has extensive experience in presenting her complex engineering and scientific opinions to a wide variety of audiences. In general, her analyses include evaluation of the injuries through an injury causation analysis or through determination of the mechanism of traumatic injury, as well as investigation of the effects of existing or hypothetical safety countermeasures such as personal protective equipment or restraints on injury outcome.

Dr. Imler's research interests include evaluation of field accident data to determine injury risk during activities including sport, recreation, and in transportation settings for particular population groups (e.g., by sporting or recreation activity, age, protective equipment worn).

Prior to joining Exponent, Dr. Imler was a Graduate Research Assistant at the Soft Tissue Biomechanics Laboratory at Georgia Tech in Atlanta, Georgia, where her research activities in orthopaedic biomechanics included studies focusing on the soft tissues in the knee. She evaluated the biosynthetic effects of external mechanical stimuli, including injurious as well as physiological loading on orthopaedic soft tissues. She has technical experience in design and development of devices to implement external mechanical stimuli, as well as experience in mechanical testing, tissue engineering, and biological assays.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Georgia Institute of Technology (Georgia Tech), 2005

M.S., Mechanical Engineering, Georgia Institute of Technology (Georgia Tech), 2001

B.S.M.E., Mechanical Engineering, Lehigh University, highest honors, 1998

National Science Foundation Graduate Research Fellowship

Clare Boothe Luce Fellowship

Georgia Tech President's Fellowship

Medtronic Fellowship

Iacocca Scholar

GTE Academic All-American

Pi Tau Sigma

Tau Beta Pi

Phi Beta Kappa

Licenses and Certifications

Licensed Professional Engineer, Georgia, #PE036575

Licensed Professional Engineer, Alabama, #35750

Licensed Professional Engineer, Mississippi, #20378LTD

Licensed Professional Engineer, New York, #100512

Licensed Professional Engineer, Pennsylvania, # PE076461

Professional Affiliations

SAE International

Publications

George J, Davis M, Sharpe S, Olberding J, Imler S, Bove R. Evaluation of Occupant Kinematics During Low- to Moderate-Speed Side Impacts. SAE Technical Paper 2020-01-1222, 2020.

Pasquesi S, Bruno A, Courtney A, Imler S, Smedley J, Prange M. Risk of concussion in low- to moderate-speed frontal and rear-end motor vehicle collisions. SAE Technical Paper 2019 01-1218.

Ellis B, Kirkpatrick E, Phan SK, Imler S, Beckham H. Measuring compression caused by garments. International Journal of Clothing Science and Technology 2018; 30(2):138-151.

Mkandawire C, Imler S, Smith J. Obese forklift operator neck loads and back load on a sit down lift truck during a sudden drop. ASME International Mechanical Engineering Congress and Exposition, IMECE2016-65169, Phoenix, AZ, 2016.

Imler SM, Heller MF, Raasch CC, Watson HN, Zhao K. The effect of rear impact collision delta-V and restraint status on injury outcome. SAE Technical Paper 2014-01-0524, 2014.

Newberry WN, Imler S, Carhart M, Dibb A, Balavich K, Croteau J, Cooper E. Belted occupant kinematics and head excursion during the airborne phase of vehicle rollover: evaluation of the effects of rollover-deployed curtain airbags. SAE Technical Paper 2014-01-0527, 2014.

Zabala ME, Yang N, Imler S, Zhao K, Ray R. Evaluation of ejection risk and injury distribution using data from the Large Truck Crash Causation Study (LTCCS). SAE Technical Paper 2014-01-0491, 2014.

Vanderploeg EJ, Wilson CG, Imler SM, Ling CH, Levenston ME. Regional variations in the distribution

and colocalization of extracellular matrix proteins in the juvenile bovine meniscus. Journal of Anatomy 2012; 221(2):174-186.

Imler SM, Heller MF, Zhao K, Watson HN, Corrigan CF. The effect of side impact collision delta-V, restraint status, and occupant position on injury outcome. SAE Technical Paper 2010-01-1158, 2010.

Heller MF, Imler SM, Zhao K, Watson HN, Corrigan CF. The effect of frontal collision delta-V and restraint status on injury outcome. SAE Technical Paper 2010-01-0145, 2010.

Mouw JK, Imler SM, Levenston ME. Ion-channel regulation of chondrocyte matrix synthesis in 3D culture under static and dynamic compression. Biomechanics and Modeling in Mechanobiology 2007; 6(1-2):33-41.

Imler SM. In vitro modulation of meniscus biosynthesis: A basis for understanding cellular response to physiologically relevant stimuli. Doctoral Dissertation, Georgia Institute of Technology, 2005.

Vanderploeg EJ, Imler SM, Brodkin KR, García AJ, Levenston ME. Oscillatory tension differentially modulates matrix metabolism and cytoskeletal organization in chondrocytes and fibrochondrocytes. Journal of Biomechanics 2004; 37(12):1941-1952.

Imler SM, Doshi AN, Levenston ME. Combined effects of growth factors and static mechanical compression on meniscus explant biosynthesis. Osteoarthritis Cartilage 2004; 12(9):736-744.

Hunter CJ, Imler SM, Malaviya P, Nerem RM, Levenston ME. Mechanical compression alters gene expression and extracellular matrix synthesis by chondrocytes cultured in collagen I gels. Biomaterials 2002; 23(4):1249-1259.

Selected Presentations and Published Abstracts

Imler SM, Heller MF, Raasch CC, Watson HN, Zhao K. The effect of rear impact collision delta-V and restraint status on injury outcome. SAE World Congress, Detroit, MI, April 10, 2014.

Newberry WN, Imler S, Carhart M, Dibb A, Balavich K, Croteau J, Cooper E. Belted occupant kinematics and head excursion during the airborne phase of vehicle rollover: evaluation of the effects of rollover-deployed curtain airbags. SAE World Congress, Detroit, MI, April 10, 2014.

Imler SM, Heller MF, Zhao K, Watson HN, Corrigan CF. The effect of side impact collision delta-V, restraint status, and occupant position on injury outcome. SAE World Congress, Detroit, MI, April 15, 2010.

Imler SM, Wilson CG, Levenston ME. IL-1 induces rapid loss of matrix constituents and material properties from meniscal fibrocartilage. Transactions of the Orthopaedic Research Society 2005; 30:1705.

Imler SM, Doshi AN, Levenston ME. Effects of anabolic cytokines and static compression on meniscus tissue explants. Transactions of the Orthopaedic Research Society 2004; 29:0663.

Imler SM, Hunter CJ, Vanderploeg EJ, Levenston ME. Matrix biosynthesis due to exogenous stimuli differs for cartilage and fibrocartilage. Proceedings, World Congress of Biomechanics, 2002.

Imler SM, Vanderploeg EJ, Hunter CJ, Levenston ME. Static and oscillatory compression modulate protein and proteoglycan synthesis by meniscal fibrochondrocytes. Transactions of the Orthopaedic Research Society 2001; 26:0552.

Imler SM, Vanderploeg EJ, Hunter CJ, Levenston ME. Mechanical compression modulates matrix synthesis in meniscal tissue and gels. Tissue Engineering 2000; 6(6):O-181.

Additional Education & Training

Practical Evidentiary Photography and Blood Detection, Documentation & Collection Techniques, Forensic Pieces, 2015

Laminated Glass: Design Considerations for Vehicle Door Systems Fast Track, SAE course, 2011

Traffic Accident Reconstruction, Northwestern University Center for Public Safety, 2008

Peer Reviewer

SAE International