

JOSEPH OLBERDING

PhD, PE

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BIOMECHANICS | TRAFFIC ACCIDENT RECONSTRUCTION

EDUCATION

UNIVERSITY OF MICHIGAN		
PhD	Biomedical Engineering	2010
TULANE UNIVERSITY		
MS	Biomedical Engineering	2004
BSE	Biomedical Engineering	2003

LICENSES & CERTIFICATIONS

Professional Engineer MI
#6201061376

AFFILIATIONS

American Society of Mechanical
Engineers (ASME)
SAE International

PROFESSIONAL PROFILE

Dr. Joseph Olberding is an engineer who assists clients in assessing injury risk and safety-related issues from a biomechanics perspective. He applies mechanics and engineering principles to the human body to answer questions regarding how, where, when, or whether an injury did or would occur. He analyzes human motion, how forces are applied to the human body, and the forces and mechanisms required to produce specific injuries, with an emphasis on motor vehicle collisions, computational modeling, and pediatric injuries.

Dr. Olberding's academic background is in computational and experimental soft tissue biomechanics, with a focus on nonlinear elasticity, viscoelasticity, and anisotropy in the context of injury, growth, and remodeling.

AREAS OF EXPERTISE

Biomechanical Accident Reconstruction
Biomechanical Modeling and Simulation
Consumer Product Design and Injury Analysis
Injury Causation
Low-Speed Vehicle Collision Reconstruction
Occupant Protection / Restraints
Pediatric Biomechanics

EXPERIENCE

Explico

2023 - Present *Managing Engineer*
2021 - 2022 *Senior Engineer*

Exponent, Inc.

Injury Biomechanics and Medical Devices Group

2016 - 2020 *Managing Engineer*
2013 - 2016 *Senior Associate / Senior Engineer*
2010 - 2013 *Associate*

University of Michigan

Department of Mechanical Engineering

2010 *Research Fellow*
2008 - 2009 *Graduate Student Instructor*
2006 *Graduate Student Instructional Assistant*
2004 - 2010 *Graduate Student Research Assistant*

Tulane University

School of Engineering

2003 *Lab Instructor*
2003 *Summer Research Associate*

AWARDS AND HONORS

Rackham Predoctoral Fellowship Program, Rackham Graduate School, University of Michigan, 2009 - 2010

Second Place, 2004 Student Paper Competition, Masters Level, Bioengineering Division, ASME International, Mechanical Engineering Congress, Anaheim, CA, 2004

William C. And Joyous Van Buskirk Graduate Scholarship in Biomedical Engineering, Department of Biomedical Engineering, Tulane University, 2003 - 2004

Biomedical Engineering Society Scholarship Award, Senior with Highest Scholastic Average, Biomedical Engineering Class of 2003, Tulane University, 2003

Rita Schaffer Award, Biomedical Engineering Society, Tulane University, 2003

Dean's Honor Scholarship, full-tuition scholarship, School of Engineering, Tulane University, 1999 - 2003

PRESENTATIONS AND PUBLISHED ABSTRACTS

J.E. Olberding, K. Garikipati, K. Grosh, L.M. Larkin, and E.M. Arruda. Role of oxygen content on the fibrogenesis of bone marrow stromal cells. In Proceedings of the 2009 Engineering Graduate Symposium, Ann Arbor, MI, November 2009b.

J.E. Olberding, K. Garikipati, K. Grosh, L.M. Larkin, and E.M. Arruda. Role of oxygen content on the fibrogenesis of bone marrow stromal cells. In Proceedings of the Biomedical Engineering Society 2009 Annual Fall Scientific Meeting, Pittsburgh, PA, October 2009a.

J.E. Olberding, M.D. Thouless, E.M. Arruda, and K. Garikipati. A role for mechanical work in focal adhesion dynamics. In Proceedings of the 2008 Engineering Graduate Symposium, Ann Arbor, MI, November 2008.

J.E. Olberding, M.D. Thouless, E.M. Arruda, and K. Garikipati. Focal adhesion dynamics: Reaction domination. In Proceedings of the Biomedical Engineering Society 2007 Annual Fall Meeting, Los Angeles, CA, September 2007.

J.E. Olberding, K. Grosh, E.M. Arruda, and K. Garikipati. Quantification of collagen fibril reorientation in volumetric image data by confocal microscopy. In Proceedings of the Biomedical Engineering Society 2006 Annual Fall Meeting, Chicago, IL, October 2006b.

J.E. Olberding, K. Grosh, E.M. Arruda, and K. Garikipati. Fibroblast-mediated collagen fibril reorientation in three dimensions using confocal reflection microscopy. In Proceedings of the 15th U.S. National Congress on Theoretical and Applied Mechanics, Boulder, CO, June 2006a.

J.E. Olberding, K. Garikipati, E. Kuhl, K. Grosh, and E.M. Arruda. Thermodynamic considerations for remodeling in biological tissue. In Proceedings of the Eighth U.S. National Congress on Computational Mechanics, Austin, TX, July 2005a.

J.E. Olberding, K. Garikipati, E. Kuhl, H. Narayanan, E.M. Arruda, K. Grosh, and S. Calve. Constitutive relations for fibril reorientation in embryonic tendon: Thermodynamic admissibility and restrictions. In Proceedings of the 2005 Summer Bioengineering Conference, Vail, CO, June 2005b.

J.E. Olberding, K. Garikipati, E. Kuhl, H. Narayanan, E.M. Arruda, K. Grosh, and S. Calve. Remodeling of biological tissue: Collagen fibril reorientation in tendon under uniaxial extension. In Proceedings of the 2005 Joint ASCE/ASME/SES Conference on Mechanics and Materials, Baton Rouge, LA, June 2005c.

J.E. Olberding and J.K.F. Suh. Validation studies for the dual-optimization of indentation creep and stress relaxation of biological soft tissues using biphasic poroviscoelasticity: Potential method for brain tissue. In Proceedings of the 2004 ASME International Mechanical Engineering Congress, Anaheim, CA, November 2004. doi: 10.1115/IMECE2004-60187.

J.E. Olberding and J.K.F. Suh. A comparative study of viscoelasticity and biphasic poroviscoelastic computational models of the brain for simulating traumatic injury. In Proceedings of the 11th Annual Pre-ORS Symposium, New Orleans, LA, February 2003. Department of Biomedical Engineering, Tulane University; Orthopaedic Research Society. Invited.

PEER-REVIEWED MANUSCRIPTS

J. Olberding, K. Petroskey, and T. Leipold. Coefficient of restitution and collision pulse duration in low-speed vehicle-to-barrier impacts. SAE Technical Paper (2023-01-0624), 2023. doi: 10.4271/2023-01-0624.

J. George, M. Davis, S. Sharpe, J. Olberding, S. Imler, and R. Bove. Evaluation of occupant kinematics during low- to moderate-speed side impacts. SAE Technical Paper, (2020-01-1222), 2020. doi: 10.4271/2020-01-1222.

A. Bruno, M. Toney-Bolger, J. George, J. Koller, A. Filatov, and J. Olberding. Evaluation of occupant kinematics in low- to moderate-speed frontal and rear-end motor vehicle collisions. SAE Technical Paper (2019-01-1226), 2019. doi: 10.4271/2019-01-1226.

W.R. Bussone, J. Olberding, and M. Prange. Six-degree-of-freedom accelerations: Linear arrays compared with angular rate sensors in impact events. SAE International Journal of Transportation Safety, 5(2): 194-207, 2017. doi: 10.4271/2017-01-1465.

K.A. Rodowicz, J.E. Olberding, and A.C. Rau. Head injury potential and the effectiveness of headgear in women's lacrosse. Annals of Biomedical Engineering, 43(4):949-957, 2015. doi: 10.1007/s10439-014-1154-x.

D. Ambrosi, G. Ateshian, E. Arruda, S. Cowin, J. Dumais, A. Goriely, G. Holzapfel, J. Humphrey, R. Kemkemer, E. Kuhl, J. Olberding, L. Taber, and K. Garikipati. Perspectives on biological growth and remodeling. Journal of the Mechanics and Physics of Solids, 59(4):863-883, 2011. doi: 10.1016/j.jmps.2010.12.011.

J.E. Olberding, M.D. Thouless, E.M. Arruda, and K. Garikipati. The non-equilibrium thermodynamics and kinetics of focal adhesion dynamics. PLoS ONE, 5(8):e12043, 2010. doi: 10.1371/journal.pone.0012043.

K. Garikipati, J.E. Olberding, H. Narayanan, E.M. Arruda, K. Grosh, and S. Calve. Biological remodeling: Stationary energy, configurational change, internal variables and dissipation. Journal of the Mechanics and Physics of Solids, 54(7): 1493-1515, 2006. doi: 10.1016/j.jmps.2005.11.011.

J.E. Olberding and J.K.F. Suh. A dual optimization method for the material parameter identification of a biphasic poroviscoelastic hydrogel: Potential application to hypercompliant soft tissues. Journal of Biomechanics, 39(13):2468-2475, 2006. doi: 10.1016/j.jbiomech.2005.07.019.

PhD, PE

PROFESSIONAL DEVELOPMENT

Motorcycle Safety Foundation

Advanced RiderCourse — 2015

Basic RiderCourse — 2014

SAE International

Vehicle Dynamics for Passenger Cars and Light Trucks — 2017

Applying Automotive EDR Data to Traffic Crash Reconstruction — 2021

Vehicle Crash Reconstruction: Principles and Technology — 2023

Photogrammetry and Analysis of Digital Media - 2026

TASS Americas (now Siemens Digital Industries Software)

MADYMO Introductory Training — 2014