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Engineering & Scientific Consulting

Sarah Sharpe, Ph.D.

Principal | Biomechanics
Tampa
+1-623-587-4190 | ssharpe@exponent.com

Professional Profile

Dr. Sharpe is an expert in the field of biomechanics, including human movement, occupant kinematics, injury mechanics, and injury tolerance and consults on automotive, recreational, law enforcement, and workplace incidents. She is also a certified tribometrist and consults on premises liability issues related to slip, trip and fall events. Dr. Sharpe has extensive testing experience and has led a variety of research and case investigations which include the application of full scale-automotive crash testing, sled testing, airbag investigations, driving demonstrations, motorcycle-operator testing, human locomotion, movement, and fall evaluations, and component-level testing involving anthropomorphic test devices (crash test dummies). Further, she has coordinated and conducted large-scale human participant testing to investigate the relationship of product use on human loading and fatigue.

Dr. Sharpe has experience tracking kinematics using motion capture systems or inertial measurement units (IMUs) and collecting and analyzing electromyography (EMG) recordings. She also has utilized 3D scanning techniques and 3D printing to capture and represent relevant geometries and has developed automated and semi-automated feature detection algorithms. During forensic inspections, Dr. Sharpe has utilized digital microscopy and ultraviolet (UV) light for identification of biological and non-biological materials.

Prior to joining Exponent, Dr. Sharpe completed a National Science Foundation Integrative Graduate Education and Research Traineeship (IGERT) fellowship where she focused on Neuroengineering. Her research projects included investigation of electrical stimulation and force production in muscle, neuronal activity using micro-electrode arrays, and alcohol's effect on task performance. She also served as a Graduate Research Assistant at the Georgia Institute of Technology's Complex Rheology and Biomechanics (CRAB) Lab. Her research involved analysis and integration of the physics of complex substrates during animal movement to understand locomotion neuromechanics on a variety of terrains. Dr. Sharpe has additionally conducted research in the Robotics and Autonomous Controls Laboratory at the University of Central Florida and in the Laboratory for Neuroengineering at the Georgia Institute of Technology.

Academic Credentials & Professional Honors

Ph.D., Bioengineering, Georgia Institute of Technology, 2013

B.S., Mechanical Engineering, University of Central Florida, 2007

National Science Foundation IGERT Fellow

Georgia Tech Bioengineering Best Student Publication Award

National Tau Beta Pi Campbell Scholar

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Licenses and Certifications

Northwestern University Center for Public Safety, Traffic Crash Reconstruction for Engineers

Professional Affiliations

Society of Automotive Engineers—SAE

American Society of Biomechanics—ASB

Biomedical Engineering Society - BMES

Publications

Sharpe SS, Grijalva S, Allin L, Courtney A, Toney-Bolger M, Pokutta-Paskaleva A, Crosby CC, Carhart M. Evaluation of Occupant Kinematics and Kinetics during Moderate Severity Simulated Frontal Impacts with and without Frontal Airbag Deployment. SAE Technical Paper 2023-01-0559.

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.

Miller B, Smedley J, Carhart M, Sharpe S, Krishnaswami R. Evaluation of laminated side glazing and curtain airbags for occupant containment in rollover, SAE Technical Paper 2020-01-0976, 2020.

Frank TA, Fowler G, Garman C, Sharpe S. Motorcycle rider inputs during typical maneuvers. SAE Technical Paper 2020-01-1000, 2020.

Astley HC, Mendelson JR, Dai J, Gong C, Chong B, Rieser JM, Schiebel PE, Sharpe SS, Hatton RL, Choset H, and Goldman DI. Surprising simplicities and syntheses in limbless self-propulsion in sand. Journal of Experimental Biology 2020; 223.

Garman CMR, Sharpe SS, Frank TA, Fowler TA. Motorcycle Rider Kinematics during Low and High Speed Turning Maneuvers. SAE Technical Paper 2018-01-0536, 2018.

Hashish R, Toney-Bolger ME, Sharpe SS, Lester BD, Mulliken A. Texting during stair negotiation and implications for fall risk. Gait & Posture 2017; 58.

Sharpe S, Brickerhoff R, Crump C, Young D. Accelerator-to-brake pedal transition movements during on-road stopping in an older population. SAE Technical Paper 2017-01-1396, 2017.

Heller M, Sharpe S, Newberry W, Dibb A, Zolock J, Croteau J, Carhart M, Kerrigan J, Clauser M. Occupant kinematics and injury response in steer maneuver-induced furrow tripped rollover testing. SAE 2015-01-1478.

Sharpe SS, Koehler SA, Kuckuk R, Serrano M, Vela P, Mendelson III J, Goldman DI. Locomotor benefits of being a slender and slick sand-swimmer. Journal of Experimental Biology 2015; 218.

Sharpe SS, Kuckuk R, and Goldman DI. Controlled preparation of wet granular medial reveals limits to lizard burial ability. Physical Biology 2015; 12(046009).

Ding Y, Sharpe SS, Wiesenfeld K, Goldman DI. Emergence of the advancing neuromechanical phase in a resistive force dominated medium. Proceeding of the National Academy of Sciences 2013; 110(25).

Sharpe SS, Ding Y, Goldman DI. Environmental interaction influences muscle activation strategy during

sand-swimming in the sandfish lizard (Scincus scincus). Journal of Experimental Biology 2012; 216(2).

Ding Y, Sharpe SS, Goldman DI. Mechanics of undulatory swimming in a frictional fluid. Public Library of Science (PLoS) Computational Biology 2012; 8(12).

Ding Y, Gravish N, Li C, Maladen RD, Mazouchova N, Sharpe SS, Umbanhowar PB, Goldman DI. Comparative studies reveal principles of movement on and within granular media. In: Natural Locomotion in Fluids and on Surfaces, 2012; Springer, New York, pp. 281-292.

Conference Podium Presentations/Abstracts

Miller BD, Elmasry SE, Sharpe SS, Allin LJ, Salipur Z. Effectiveness of Bicycle, Motorcycle, and Skateboard Helmets in Reducing Risk of Concussion and Skull Fracture Across Various Impact Locations and Velocities. American Society of Biomechanics Annual Meeting, Pittsburgh, PA, August 13-16, 2025.

Sharpe S, Brickerhoff R, Crump C, Young D. Accelerator-to-brake pedal transition movements during on-road stopping in an older population. SAE 2017 World Congress and Exhibition, Detroit, Michigan.

Heller M, Sharpe S, Newberry W, Dibb A, Zolock J, Croteau J, Carhart M, Kerrigan J, Clauser M. Occupant kinematics and injury response in steer maneuver-induced furrow tripped rollover testing. SAE 2015 World Congress and Exhibition, Detroit, Michigan.

Sharpe SS, Ding Y, Goldman DI. Neuromechanics of sand-swimming. International Congress of Vertebrate Morphology, Barcelona, Spain, 2013.

Sharpe SS, Masse A, Taz H, Goldman DI. Limb use during burial of the sandfish lizard. Society for Integrative and Comparative Biology Annual Meeting, San Francisco, CA, 2013.

Sharpe SS, Kuckuk RM, Goldman DI. Ground resistance influences lizard burial in dry and wet sand. Division of Fluid Dynamics of the American Physical Society, San Diego, CA, 2012.

Sharpe SS, Goldman DI. Muscle activation strategy in the sand-swimming sandfish lizard (Scincus scincus). American Society of Biomechanics Annual Meeting, Gainesville, FL, 2012.

Sharpe SS, Ding Y, Goldman. Muscle activation strategy in the sandfish. International Physics of Living Systems Meeting, Montpellier, France, 2012.

Sharpe SS, Kuckuk RM, Goldman DI. Resistance force in wet granular media. Soft Materials Workshop, Atlanta, GA, 2012.

Sharpe SS, Judy KN, Daffon K, Goldman DI. Burrowing of the ocellated skink (Chalcides ocellatus). Society for Integrative and Comparative Biology Annual Meeting, Charleston, SC, 2012.

Steinmetz SM, Ding Y, Goldman DI. Sandfish model predicts muscle activation pattern during subsurface sand diving. Society for Integrative and Comparative Biology Annual Meeting, Salt Lake City, UT, 2011.

Steinmetz SM, Ding Y, Maladen RD, Goldman DI. Biomechanical interaction with granular media influences activation strategy during subsurface sand-swimming. Alberta Motor Control, Neurohike Meeting, Alberta, Canada, 2010.

Steinmetz SM, Maladen RD, Ding Y, Goldman DI. Muscle activation during surface and subsurface locomotion in sandfish (Scincus scincus). Society for Integrative and Comparative Biology Annual Meeting, Seattle, WA, 2010.

Steinmetz SM, Goldman DI. Electromyographic study of sand-swimming lizards within granular media. Graduate Research Symposium at Georgia Tech, Atlanta, GA, 2009.

Conference Poster Presentations

Sharpe SS, Kuckuk RM, Goldman DI. Burrowing of the ocellated skink (Chalcides ocellatus) in wet and dry granular media. Georgia Tech Research and Innovation Conference, Atlanta, GA, 2012.

Sharpe SS, Ding Y, Goldman DI. Environmental interaction influences muscle activation strategy during sand-swimming in the sandfish lizard (Scincus scincus). Georgia Tech Research and Innovation Conference, Atlanta, GA, 2011.

Invited Lectures and Seminars

Sharpe SS. Biomechanics: Injury Evaluation and Prevention. ASU Failure Analysis & Prevention Course. Arizona State University, November 2020, November 2021, and October 2022.

Sharpe SS, Grayish ND, Goldman DI. Introduction to electromyography (EMG). Hands-On Research School, Shanghai Jiao Tong University, Shanghai, China, 2012.

Steinmetz SM, Ding Y, Maladen RD, Goldman DI. Interaction with granular media influences activation strategy during subsurface sand-swimming. Georgia Tech Applied Physiology Seminar, Atlanta, GA, 2011.

Steinmetz SM, Ding Y, Li C, Mazouchova N, Maladen RD, Goldman DI. Locomotion on granular media: Biologically inspired physical models enhance understanding. GT^2 Symposium Innovation Workshop, Atlanta, GA, 2010.

Steinmetz SM, Maladen RD, Ding Y, Goldman DI. Muscle activation during surface and subsurface locomotion in sandfish (Scincus scincus). NeuroTalk Seminar at Georgia Tech, Atlanta, GA, 2010.

Peer Reviews

Society of Automotive Engineers

Journal of Experimental Biology