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ARCCA Biomechanical Engineering

Determining Injury Causation

David L. Gushue, Ph.D. *Director of Biomechanical Engineering*

Dr. Gushue holds Ph.D. in Biomedical Engineering and a M.S. Degree in Biomedical Engineering from the University of Rochester and a B.S. in Bioengineering with a minor in Neuroscience from Syracuse University. He has performed human and anthropomorphic testing and is familiar with the theory and application of human tolerance to inertial and impact loading. He specializes in the study of kinematics and kinetics of the human body, as well as injury mechanisms and associated tolerances.

Brian J. Benda, Ph.D.

Dr. Benda holds a Ph.D. (Medical Engineering) from M.I.T./Harvard University's Division of Health Science and Technology, a M.S. (Structural Mechanics) from Stanford and a B.S. (Aeronautical Engineering) from Purdue. During his 25 year career. Dr. Benda has applied engineering and physiological principles to neuromusculoskeletal research in human injury and forensic biomechanics, and to the design, development, and failure analysis of medical devices.

Bradley W. Probst, Ph.D. Candidate

Mr. Probst holds a M.S. Degree in Biomechanical Engineering, a B.S. in Mechanical Engineering from University of Louisiana, and is currently a Biomechanical Engineering Ph.D. candidate at Tulane University. Areas of specialty include: impact and inertial injury analysis, injury mechanism determination and crash kinematics.

Timothy G. Joganich, M.S., CHFP

Mr. Joganich has a M.S. in Exercise Science (emphasis in Biomechanics) and a B.S. in Mechanical Engineering, both from Arizona State University. He is a Certified Human Factors Professional. Areas of expertise include: injury mechanics, occupant kinematics, ingress/egress, evaluations of slip, trip and falls (including slip resistance testing), human factors evaluations for product safety and bicycle accident reconstruction.

Andrew J. Rentschler, Ph.D.

Dr. Rentschler holds Ph.D. and M.S. Degrees in Bioengineering from the University of Pittsburgh and a B.S. in Mechanical Engineering with a minor in Biomedical Engineering from Carnegie Mellon University. His areas of specialty include: human injury tolerance, wheelchair transportation safety and injury mechanism analysis.

Ronald J. Fijalkowski, Ph.D.

Dr. Fijalkowski received a Ph.D. in Biomedical Engineering from Marquette University while participating in research at the Medical College of Wisconsin. Investigations included live-surrogate, cadaveric and anthropomorphic testing in various environments and loading conditions. This background has provided a unique knowledge of human injury induction mechanisms, tolerance thresholds and mitigation techniques.

Calum G. McCrae, Ph.D. holds a Ph.D. in Biomedical Engineering and an M.Eng. in Mechanical Engineering from the University of Glasgow, Scotland. Dr. McCrae has instructed biomechanics and bio-computational languages at Drexel University and specializes in the application of their theory for injury mechanism analysis.

Associate Experts

Jennifer A. Shultz, Technical Quality Assurance Engineer - B.S. in Biomedical Engineering with a minor in Mechanical Engineering.

A'Liah S. Hines, Ph.D.- holds Ph.D. and M.S. Degrees in Biomedical Engineering from University of Akron; and holds a B.S. in Mechanical Engineering from GMI Engineering & Management Institute. She specializes in crash injury analysis, injury mechanism determination and crash kinematics.

David R. Barnes, M.S. - M.S. degree in Biomedical Engineering from Marquette University and a B.S. degree in Physics from Allegheny College.

Brendan J. Morse, M.S. - M.S. in Biomedical Engineering from the University of Rochester and a B.S. in Mechanical Engineering with a specialty in Bioengineering from Kettering University.



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BIOMECHANICS AND HUMAN INJURY ANALYSIS

ARCCA's biomechanics and biomedical experts look at the medical intricacies of the human body from an engineering perspective. Biomechanics combines medicine and engineering by studying and calculating the forces and directions that cause specific trauma, as well as the requirements to mitigate those very same injuries. Accordingly, our experts assess all areas in which human trauma can occur. We conduct our own extensive testing and utilize simulation software and other tools to assess and predict occupant kinematics.

OUR CASES

LOWSPEED REAR IMPACT

Tow Truck Rear-Ends Minivan. Plaintiff alleged extensive lumbar injuries, underwent disc surgery, sued for \$200,000+. ARCCA biomechanical analysis drove settlement down to \$40,000 on the eve of trial.

SLIP TRIP & FALL ANALYSIS

Negligent Maintenance or Faulty Footwear? Plaintiff's fall on wet marina stairs caused serious ankle injury. ARCCA slip resistance testing showed the stairs provided adequate slip resistance even when wet. Biomechanical injury analysis revealed plaintiff fell off the side of her platform sandal. ARCCA report contributed to a significantly reduced settlement.

WORKERS COMPENSATION

SUBROGATION

Armored Van Messenger Crushed by Coins. Van retrofit resulted in employee paraplegia when struck by cargo. ARCCA's complete accident re-creation, biomechanical analysis and visual presentation showed the jury that claimant was belted and injuries were caused by an inadequate cargo restraining bar. \$34 million verdict and complete recovery of workers compensation lien.

BIOMECHANIC SPECIALTIES

Low Speed Impacts

Biomechanical Injury Analysis

Workers Compensation

Movement Analysis

Occupant Protection

Minor Injuries Soft Tissue

Brain Trauma

Injury Causation

Slip, Trip & Fall

Human Occupant Kinematics

Ergonomics

Human Factors

Seat Belt Defense

Human Tolerance

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