



**D E S I G N  
R E S E A R C H  
E N G I N E E R I N G**

46475 Desoto Court  
Novi, Michigan 48377  
Tel: (248) 668 - 3450  
Fax: (248) 668 - 3460

## **MATTHEW J. MASON**

### **Professional Specialization**

Designing test devices, fixtures, and components to facilitate testing and research in the area of impact biomechanics for application to automotive and non-automotive related concerns. Conducting research tests directed toward determining the underlying causes or mechanisms associated with a specific impact related injury as well as tests associated with the evaluation of some aspect of a vehicle design or component, which entails: developing an overall test design and protocol to achieve the desired test objective; operation and calibration of test devices or machines, data acquisition hardware, measurement transducers, and high-speed video cameras; compilation and analysis of test data.

Past involvement in specific areas of research includes: design improvements on a specialized device for high-rate biaxial tissue/material testing; development and refinement of a biofidelic abdominal insert for the Hybrid III midsize dummy; development of a biofidelic abdominal insert for the Hybrid III 6yr old dummy; investigation of human skeletal kinematics during simulated rear-end impact; brain motion during blunt impact; designing and building a prototype test device for investigating cellular response to short duration pressure pulses; investigation of traumatic rupture of the aorta; investigation of the kinematics of lateral bending on compressive neck injury kinematics and tolerance; evaluation of Indy car gearbox attenuator; vehicle pre-certification crashworthiness testing; dynamic sled to sled side-impact testing; evaluation of a multi-link door hinge design on vehicle ingress/egress; federal 30mph integrity pre-certification seat testing; knee bolster impact testing and instrument panel evaluation; pre-production automotive restraint testing.

### **Education**

B.S. (Electromechanical Engineering Technology), Wayne State University, Detroit, MI

### **Professional Background**

#### **Project Engineer**

Design Research Engineering, Novi, MI  
2009 - present

#### **Research Engineer I**

Bioengineering Center, Wayne State University, Detroit, MI  
2004 - 2008

#### **Research Assistant**

Bioengineering Center, Wayne State University, Detroit, MI  
2000 - 2004

#### **Impact Sled Technician I**

Bioengineering Center, Wayne State University, Detroit, MI  
1992 - 2000

#### **Engineering Technician III**

University of Michigan Transportation Research Institute, Ann Arbor, MI  
1995

#### **Research Technician I**

Bioengineering Center, Wayne State University, Detroit, MI  
1989 - 1992

#### **Student Assistant**

Bioengineering Center, Wayne State University, Detroit, MI  
1988 - 1989



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John Paul Stapp Award

Best paper at the 2007 Stapp Car Crash Conference

John Paul Stapp Award

Best paper at the 2001 Stapp Car Crash Conference

### **Publications**

- "Exploring the Role of Lateral Bending Postures and Asymmetric Loading on Cervical Spine Compression Responses," ASME International Mechanical Engineering Congress IMECE2009-12911, 2009 (Submitted) (with D. Toomey, W. Hardy, K. Yang, J. Kopacz, S. Kobayashi, C. Van Ee)
- "Mechanisms of Traumatic Rupture of the Aorta and Associated Peri-isthmic Motion and Deformation," Stapp Car Crash Journal, 2008 (with W. Hardy, C. Shah, J. Kopacz, K. Yang, A. King, C. Van Ee, J. Bishop, R. Banglmaier, M. Bey, R. Morgan, K. Digges)
- "Up-Regulation Of Reactivity and Survival Genes in Astrocytes after Exposure to Short Duration Overpressure," Neuroscience Letters, 2008 (with P. VandeVord, L. Leung, W. Hardy, K. Yang, A. King)
- "A Study of the Response of the Human Cadaver Head to Impact," Stapp Car Crash Journal, 2007 (with W. Hardy, C. Foster, C. Shah, J. Kopacz, K. Yang, A. King, J. Bishop, M. Bey, W. Anderst, S. Tashman)
- "Dynamic Biaxial Tissue Properties of the Human Cadaver Aorta," Stapp Car Crash Journal, 2006 (with C. Shah, W. Hardy, K. Yang, C. Van Ee, R. Morgan, K. Digges)
- "Comparison of Intracranial Pressure Response to Cadaver Head Kinematics," Journal of Biomechanics, 2006 (Abstract) (with W. Hardy, C. Foster, K. Yang, A. King)
- "Investigation of Potential Mechanisms of Traumatic Rupture of the Aorta," Journal of Biomechanics, 2006 (Abstract) (with W. Hardy, C. Shah, K. Yang, C. Van Ee, R. Morgan, K. Digges)
- "Shoulder Injury and Response Due to Lateral Glenohumeral Joint Impact: An Analysis of Combined Data," Stapp Car Crash Journal, 2005 (with S. Koh, J. Cavanaugh, S. Petersen, D. Marth, S. Rouhana, J. Bolte)
- "High-Speed Biaxial Tissue Properties of the Human Cadaver Aorta," ASME International Mechanical Engineering Congress IMECE2005-82085, 2005 (with C. Shah, K. Yang, W. Hardy, C. Van Ee, R. Morgan, K. Digges)
- "A New Device for High-Speed Biaxial Tissue Testing: Application to Traumatic Rupture of the Aorta," SAE Transactions 2005-01-0741 (with C. Shah, M. Maddali, K. Yang, W. Hardy, C. Van Ee, K. Digges)
- "Comparison of Relative Motion Between the Brain and Skull of the Human Cadaver for Rotation in the Coronal and Sagittal Planes," 4<sup>th</sup> World Congress of Biomechanics, 2002 (Abstract) (with A. King, W. Hardy, S. Tashman)
- "Investigation of Head Injury Mechanisms Using Neutral Density Technology and High-Speed Biplaner X-ray," Stapp Car Crash Journal, 2001 (with W. Hardy, C. Foster, K. Yang, A. King, S. Tashman)
- "Development of a Sled to Sled Subsystem Side Impact Test Methodology," SAE Transactions, No. 970569, 1997 (with J. Chung, J. Cavanaugh, A. King)
- "A Side Impact Sub-System Test Device - Sled to Sled Test Setup," Proceedings of the 22<sup>nd</sup> Annual International Workshop on Human Subjects for Biomechanical Research, 1994 (with Y. Huang, J. Cavanaugh, W. Hardy, A. King)