



## BRENDAN J. MORSE, P.E., M.S.B.M.E., CHFP, ACTAR

### PROFESSIONAL BIOGRAPHICAL OUTLINE

#### BACKGROUND

Mr. Morse earned a Master of Science degree in Biomedical Engineering from the University of Rochester, in Rochester, New York and a Bachelor of Science in Mechanical Engineering from Kettering University, in Flint, Michigan. Mr. Morse performed nondestructive full-scale crash sled tests with child safety seats while at Kettering University. These tests studied variations in child seat restraints using child anthropomorphic test devices. Mr. Morse studied vehicular crash dynamics, accident reconstruction and occupant protection. During his graduate studies, Mr. Morse investigated the mechanical forces and variations within the knee joint, including investigations into ligament deficiencies, meniscal changes, cartilage variations, and varus/valgus alignments. Mr. Morse adapted and updated an intricate full contact knee model. Using a three-dimensional knee contact model, Mr. Morse investigated the effects and distribution of joint contact forces during daily activities in order to improve orthopaedic implant designs.

Mr. Morse is a licensed Professional Engineer (P.E.) in Washington state, Idaho, Colorado, Oregon, and Utah, an accredited Traffic Accident Reconstructionist by the Accreditation Commission for Traffic Accident Reconstruction (ACTAR), a certified Crash Data Retrieval (CDR) Technician, and a member of the Washington Association of Technical Accident Investigators (WATAI). Additionally, he holds a certification as a Certified Human Factors Professional (CHFP).

This background has provided a detailed knowledge of physics, human anatomy, kinematics, injury tolerance, physiology, human factors and biomechanics as they apply to injury mechanisms and human tolerance. He applies his expertise from these areas to accident reconstruction, slip, trip and fall events, occupant kinematics, occupant crash protection, human factors, and biomechanical analysis.

#### SUMMARY OF EXPERIENCE

- Performs accident reconstruction analyses for automobiles, heavy trucks, motorcycles, bicycles, and pedestrians
- Investigates all types of automotive vehicle incidents along with pedestrian/bicycle incidents including investigation and inspection of incident scenes, components, and vehicles
- Evaluates occupant kinematics along with the design and performance of occupant protection systems
- Analyzes slip, trip and fall events utilizing expertise in biomechanics, human factors, and codes
- Performs human factors and ergonomics analyses for work stations and work place environments
- Conducted research to determine the influence of mechanical forces on the knee joint and surrounding soft tissues due to altered tissue properties
- Evaluated various gait analyses to determine the effects on the joints of the lower extremities
- Developed mathematical models to estimate the distribution of joint contact forces within joints during dynamic activities

#### AREAS OF SPECIALTY

- Accident Reconstruction
- EDR (Black Box) Imaging and Analysis
- Infotainment and Telematics Analysis
- ATV/UTV/Snowmobile Investigation
- Human Factors and Ergonomics
- Slip/Trip/Fall Kinematics and Kinetics
- Human Injury Tolerance and Mechanisms
- Occupant Kinematics and Protection

## EDUCATION

- Master of Science in Biomedical Engineering, University of Rochester, 2010
- Bachelor of Science in Mechanical Engineering, Bioengineering Specialty, Kettering University, 2007

## PROFESSIONAL EXPERIENCE

### 2010 – Present | ARCCA, Incorporated | Director of Accident Reconstruction – West Coast, V.P., Senior Biomechanist

- Evaluates injury potential along with ergonomics, human factors, and work place kinematics.
- Practices biomechanics to evaluate injury mechanisms and severity.
- Evaluates slip, trip, and fall events including codes/standards and slip resistance testing.
- Provides instruction in the areas of accident reconstruction, vehicle forensics, human factors, biomechanics, injury mechanism analysis and slip/trip/fall events.
- Utilizes medical records, testing, computer modeling and knowledge of human injury tolerance to determine whether a claimed injury is consistent with a specific set of actions or exposure to a specific incident environment.
- Utilizes anthropomorphic test devices (ATDs) and human volunteers to perform human factors and biomechanical research.
- Team member working with the National Hockey League (NHL) to research, develop, and test designs to improve player safety.

### 2008 – 2010 | University of Rochester | Research Assistant

- Conducted research on the relationships between mechanical forces and variations within the knee joint, including investigations into ligament deficiencies, meniscal changes, cartilage variations and varus/valgus alignments.
- Studied knee biomechanics through creating MR image-based three dimensional knee joint models and analyzing in ABAQUS finite element software. Researched varus/valgus knee laxity and the roles of soft tissues in the knee joint regarding the onset of osteoarthritis.
- Utilized a three dimensional knee model to evaluate the effects of daily activities with varying knee joint properties, specifically varus/valgus laxity with joint loading, for further improvement to orthopaedic knee implants.

### 2004 – 2008 | Polaris Industries, Inc. | Design/Manufacturing Engineer

- Snowmobile manufacturing engineer responsible for capital ergonomic projects, assembly process changes, station layouts, and general assistance to the production line.
- Installed equipment to assist with ergonomic improvements while meeting OSHA and Polaris safety standards.
- Studied the ergonomic effects on the human body and made the necessary changes to provide a safe and effective work zone.
- Performed human factors and assembly line layout study in order to implement mixed model production. Detailed individual job requirements along with logistics for work station integration into mixed model production.
- Team member working with the snowmobile manufacturing engineering group to develop and implement assembly techniques for the new model lines.

- Worked on product improvement as a manufacturing and test engineer for UTV, ATV and snowmobile product lines. In addition, worked as a design engineer for the snowmobile group developing and implementing new technology.

## PROFESSIONAL AFFILIATIONS, CERTIFICATIONS AND TRAINING

- Professional Engineer in:
  - WA License, # 21024608
  - ID License, 20674
  - CO License, PE.0059802
  - OR License, # 98830PE
  - UT License, 12516187-2202
- ACTAR accredited Accident Reconstructionist, #2888
- Certified Human Factors Professional (CHFP) (Certificate No. 1960), BCPE, October 2021
- Certified Crash Data Retrieval Technician, Levels 1 and 2
- Certified in Vehicle System Forensics, Berla Corporation, November 2016
- Certified in FARO Focus 3D Scanning, Planning and Interpretation, January 2017
- Institute of Police Technology and Management, *Event Data Recorder Use in Traffic Crash Reconstruction – Level 1*, University of North Florida, May 2017
- Institute of Police Technology and Management, *Traffic Crash Reconstruction Course*, University of North Florida, October 2014
- Member, Biomedical Engineering Society
- Member, American Society of Safety Professional
- Member, American Society of Automotive Engineers
- Member, American Society of Mechanical Engineers
- Member, Washington Association of Technical Accident Investigators

## PUBLICATIONS

Harrington, S., Teitelman, J., Rummel, E., **Morse, B.**, Chen, P., Eisentraut, D., & McDonough, D. (2017). Validating Google Earth Pro As a Scientific Utility for Use in Accident Reconstruction (No. 2017-01-9750). SAE Technical Paper.

## MASTER'S THESIS

**Morse, B.J.**, *Investigating the Contributors to Varus/Valgus Laxity in the Healthy Knee Joint*. University of Rochester, Rochester, NY

## UNDERGRADUATE THESIS

**Morse, B.J.**, *Snowmobile Driveline Efficiency* (Confidential), Polaris Industries, Inc. Kettering University, Flint, MI



## ABSTRACTS/PRESENTATIONS

- March 2010** Morse, B, Funkenbusch, PD, Lerner, AM, *Validation and Variability in a Proximal Tibia Model*. Orthopaedic Research Society Annual Meeting, New Orleans, LA.
- March 2010** Morse, B, Lerner, AM, *Alignment Effects on Contact Force Distribution, Area, and Centroid*. Orthopaedic Research Society Annual Meeting, New Orleans, LA.
- April 2010** Morse, B, Funkenbusch, PD, Lerner, AM, *Validation and Variability in a Proximal Tibia Model*. UNYBEC Conference, Rochester, NY.
- April 2010** Morse, B, Lerner, AM, *Alignment Effects on Menisco-Tibio-Femoral Contact Force Distribution, Area, and Centroid*. UNYBEC Conference, Rochester, NY.

## COURSE INSTRUCTION

- Dalecki, D, Morse, B. BME 101 Lab. University of Rochester, Rochester, NY, Fall 2008
- Lerner, AM, Morse, B. Biosolid Mechanics. University of Rochester, Rochester, NY, Fall 2009
- Lerner, AM, Morse, B. Biosolid Mechanics. University of Rochester, Rochester, NY, Spring 2010