

William Bussone, P.E.
Senior Engineer

Professional Profile

Mr. William Bussone is a Senior Engineer in Exponent's Biomechanics practice. Mr. Bussone addresses issues involving the biomechanics of human injury, with expertise in the areas of human tolerance, occupant kinematics, and rigid body dynamics. His work includes analysis of traumatic injuries associated with transportation, sport, and amusement activities. Mr. Bussone has published research in brain injury biomechanics and amusement ride biomechanics. Mr. Bussone also has technical expertise in the areas of biodynamics, and computer simulation of impact. In his capacity as a Research Associate at the Virginia Tech – Wake Forest Center for Injury Biomechanics at Virginia Tech, he researched brain injuries in collegiate football and head accelerations in everyday events.

Academic Credentials and Professional Honors

M.S, Mechanical Engineering, Virginia Polytechnic Institute and State University, 2005
B.S., Biomedical Engineering, Michigan Technological University (*summa cum laude*), 2003

National Science Foundation Graduate Research Fellow (2003–2005); Tau Beta Pi Honor Society; President, Biomedical Engineering Society (BMES) - MTU Chapter (2002–2003); MTU Biomedical Engineering Student Advisory Board, Co-Chair and Founding Member (2001–2003); President, Michigan Tech Fencing Club (2000–2002); National Merit Scholar (1999)

Licenses and Certifications

Licensed Professional Engineer, Maryland, #39199
Licensed Professional Engineer, Connecticut, #28224

Publications

Bussone WR, Baxter JN, Mkandawire C. Foot injury patterns with protective footwear after lift truck impact. ASME International Mechanical Engineering Congress & Exposition, IMECE2010-39131, Vancouver, British Columbia, Canada, 2010.

Bussone WR, Duma SM. The effect of gender and body size on angular accelerations of the head observed during everyday activities. *Biomedical Sciences Instrumentation* 2010; 46:166–171.

Bussone WR, Bove RT, Thomas R, Richards D, Prange MT. Six-degree of freedom accelerations: Linear arrays compared with angular rate sensors. SAE 2010-01-1017.

Bussone WR, Moore TLA, Richards D, Bove RT, Scher I, Prange MT. Measurements of non-injurious head accelerations of a pediatric population. SAE 2009-01-0383.

Ng TP, Bussone WR, Duma SM. The effect of gender and body size on linear accelerations of the head observed during daily activities. *Biomedical Sciences Instrumentation* 2006; 42:25–30.

Ng TP, Bussone WR, Duma SM, Kress TA. Thoracic and lumbar spine accelerations in everyday activities. *Biomedical Sciences Instrumentation* 2006; 42:410–415.

Duma SM, Manoogian SJ, Bussone WR, Brolinson PG, Goforth MW, Donnenwerth JJ, Greenwald RM, Chu JJ, Crisco JJ. Analysis of real-time head accelerations in collegiate football players. *Clinical Journal of Sports Medicine* 2005; 15:3–8.

Selected Invited Presentations

Bussone WR, Duma SM. The effect of gender and body size on angular accelerations of the head observed during everyday activities. Presented at the 47th Annual Rocky Mountain Bioengineering Symposium, Laramie, WY, April 9, 2010.

Bussone W. Biomechanics of pool inlet injuries—The Virginia Baker Act. Presented at the Pennsylvania Spring Amusement Ride Safety Seminar, Grantville, PA, February 25, 2010.

Bussone W. Biomechanics of amusement rides and devices. Presented at the Pennsylvania Spring Amusement Ride Safety Seminar, Grantville, PA, February 25, 2010.

Bussone WR, Moore TLA, Richards D, Bove RT, Scher I, Prange MT. Measurements of non-injurious head accelerations of a pediatric population. Presented at the 2009 SAE World Congress, Detroit, Michigan, April 21, 2009.

Bussone W. Biomechanics of pool inlet injuries—The Virginia Baker Act. Presented at the Pennsylvania Spring Amusement Ride Safety Seminar, Grantville, PA, February 24–27, 2009.

Bussone W. Biomechanics of amusement rides and devices. Presented at the Pennsylvania Spring Amusement Ride Safety Seminar, Grantville, PA, February 24–27, 2009.

Bussone W. Biomechanics of amusement rides and devices. Presented at the Pennsylvania Spring Amusement Ride Safety Seminar, Grantville, PA, February 26–29, 2008.

Heller M, Mkandawire C, Gloeckner DC, Bussone W, Scher I, Cargill R. Head motion in the coronal plane during low-speed lateral impact collisions. Presented at the Conference of the International Society of Biomechanics, Taipei, Taiwan, July 2007.

Cargill RS, Bussone WR, Scher I, Heller MF. Current trends in amusement industry biomechanics: introduction to biomechanics and rider kinematics. Presented at the IAAPA Attractions Expo Education Programs, Atlanta, GA, November 13–17, 2006.

Duma SM, Manoogian SJ, Bussone WR, Brolinson PG, Goforth MW, Donnenwerth JJ, Greenwald RM, Chu JJ, Crisco JJ. Measuring real time head accelerations in collegiate football players. Presented at the Fundamentals and Advanced Concepts for Automobile and Sports Injury Biomechanics Conference, Roanoke, VA, October 22–23, 2004.

Duma SM, Manoogian SJ, Bussone WR, Brolinson PG, Goforth MW, Donnenwerth JJ, Greenwald RM, Chu JJ, Crisco JJ. Sports injury biomechanics: head impact research in collegiate football. Presented at the Fundamentals and Advanced Concepts for Automobile and Sports Injury Biomechanics Conference, Roanoke, VA, February 7, 2004.

Prior Experience

Graduate Research Associate, Virginia Tech – Wake Forest Center for Injury Biomechanics at Virginia Tech, 2003–2005

Project Experience

Studied concussion and other mild traumatic brain injuries, *in-vivo*, in NCAA Division-I collegiate football utilizing an instrumented football helmet. Studied concussion tolerance utilizing reconstructions of filmed collisions in the NFL. Evaluated the tolerance threshold for concussions and “stingers.”

Studied head accelerations seen in everyday activities, bumper cars, and roller coasters. Instrumented volunteers with accelerometer arrays and measured self-exposure thresholds and accelerations applied by amusement rides.

Investigated alleged accident kinematics in a worker’s fall from a construction site. Constructed of full-scale physical model and computer recreation of the accident site. Compared alleged scenarios with the physical evidence.

Investigated alleged injuries on amusement rides (roller coasters and flat rides), race cars, construction equipment (fork lifts, skid-steer loaders, front-end loaders), power tools, elevators, and automobiles.

Evaluated shoulder loads in alleged forklift accident. Determined pathology was inconsistent with alleged accident sequence and inconsistent with purported injury mechanism.

Professional Affiliations

- Society of Automotive Engineers—SAE
- ASTM International; ASTM Committee F24 on Amusement Rides and Devices
- International Association of Amusement Parks and Attractions—IAAPA
- National Association of Amusement Ride Safety Officials—NAARSO